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Weston Electrical Instrument Corp. F19-22

Broadcasting Equipment

Radio Corp. of America D17-22

Broilers—Electric

General Electric Company Ec/1

Bronze Tablets & Signs

Michaels Art Bronze Co., Inc. B56
Spencer Industries, Inc. B57
Stewart Iron Works Co. H26
United States Bronze Sign Co., Inc. .. B58

Brushes & Brooms

Fuller Brush Company H8
Legge Company, Inc. H16

Builders' Hardware

Glynn-Johnson Corporation Bk/5
Rixson Co., Oscar C. Bk/3
Sargent & Greenleaf, Inc. B52, 53
Vonnegut Hardware Co., Von Duprin Div. B54
Yale & Towne Mfg. Company Bk/4

Building Fund Campaigns

American City Bureau A11

Building Restoration

Horn Corporation, A. C. Ah/1
Structural Waterproofing Corp. A33
Western Waterproofing Co., Inc. A35

Built-Up Roofing

Barrett Div., Allied Chemical & Dye Corp. A15
Johns-Manville B23-26

Bulletin & Directory Boards

Bangor Cork Co. B36
Claridge Products & Equipment, Inc. B37
Jacmen Company B39
Michaels Art Bronze Co., Inc. B56
Moduwall, Inc. Bh/1
Rowles Co. B42
Spencer Industries, Inc. B57
Stewart Iron Works Co. H26
United States Bronze Sign Co., Inc. .. B58
United States Plywood Corp. B45

Burners—Heating System

Babcock & Wilcox Company C9
Cyclotherm Div., United States Radiator Corp. C12
Farrar & Trefts, Inc. C13
International Boiler Works Co. C16
Jackson & Church Company C17
Orr & Sembower, Inc. Ca/3
Petro C20, 21
Smith Co., Inc., H. B. Ca/4
Titusville Iron Works, Div. Struthers Wells Corp. C22, 23

Buses

Wayne Works, Inc. H35

Buzzers, Chimes & Horns

Graybar Electric Co., Inc. C54
International Business Machines Corp. Cg/1

Montgomery Mfg. Co. C55
Simplex Time Recorder Co. Cg/3
Standard Electric Time Company .. Cg/2

Cabinet Hardware (see Wardrobe Hardware)

Cabinets—Filing

All-Steel Equipment Inc. D67
Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Lyon Metal Products, Inc. F64, 65
Mosler Safe Company D78
Mutschler Brothers Company Ec/2
Penn Metal Corp. of Penna. F68, 69
Remington Rand Inc. F76, 77
Republic Steel, Berger Mfg. Div. F64
Rowles Co. D52
Wood-Metal Industries, Inc. Ec/3

Cabinets—Kitchen

General Electric Company Ec/1
Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. .. F26, 27
Lyon Metal Products, Inc. F64, 65
Mutschler Brothers Company Ec/2
Wood-Metal Industries, Inc. Ec/3

Cabinets—Special (Specimen, Film, etc.)

All-Steel Equipment Inc. D67
Art Metal Construction Co. De/1
Colonial Engineering Company Dc/7
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. ... F26, 27
Lyon Metal Products, Inc. F64, 65
Market Forge Company Eb/4
Medart Products, Inc. F66, 67
Metalab Equipment Corp. F28, 29
Moduwall, Inc. Bh/1
Mutschler Brothers Company Ec/2
Republic Steel, Berger Mfg. Div. ... F63
Sjostrom Co., Inc., John E. D66; F30
Star Steel Equipment Co., Inc. F71
Wood-Metal Industries, Inc. Ec/3

Cabinets—Storage

All-Steel Equipment Inc. D67
Art Metal Construction Co. De/1
Colonial Engineering Company Dc/7
Crescent Metal Products Inc. E23
Diebold, Inc. D68, 69
General Electric Company Ec/1
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. ... F26, 27
Lyon Metal Products, Inc. F64, 65
Market Forge Company Eb/4
Medart Products, Inc. F66, 67
Moduwall, Inc. Bh/1
Mutschler Brothers Company Ec/2
Penn Metal Corp. of Penna. F68, 69
Republic Steel, Berger Mfg. Div. ... F63
Remington Rand Inc. F76, 77
Sjostrom Co., Inc., John E. D66; F30
Standard Pressed Steel Co. F60
Star Steel Equipment Co., Inc. F71
Wood-Metal Industries, Inc. Ec/3

Cafeteria Equipment

Aluminum Cooking Utensil Company E18, 19
Anetsberger Brothers, Inc. Eb/1
Blickman, Inc., S. E20
Boonton Molding Company E12
Cleveland Range Co. E21
Corning Glass Works E14, 15
Crescent Metal Products Inc. E23
Keyes Fibre Sales Corporation E16
Market Forge Company Eb/4
National Cornice Works Eb/3
Puffer-Hubbard Refrigerator Co. E25
Van Range Co. E32

Cafeteria Furniture (see Furniture—Multi-Purpose)

Cans—Step-on, for Waste

United Metal Box Co., Inc. G29

Card Files & Systems

Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
International Business Machines Corp. Cg/1
Remington Rand Inc. D76, 77

Carts—Food Service

Blickman, Inc., S. E20
Colson Corporation E22
Crescent Metal Products Inc. E23
National Cornice Works Eb/3

Carts—Tools, Books, Chairs, etc.

Brewer-Titchener Corporation D58
Colson Corporation E22
Midwest Folding Products D62
Mitchell Mfg. Co. D60, 61
Monroe Company D63
Standard Pressed Steel Co. F60
Sjostrom Co., Inc., John E. D66

Casements—Door & Window

Aluminum Window Manufacturers Association Ad/2
General Bronze Corporation Ad/4
Mamet Corporation Ad/7

Cases—Museum & Display

Globe-Wernicke Co. D70, 71
Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. ... F26, 27
Metalab Equipment Corp. F28, 29
Michaels Art Bronze Co., Inc. B56
Remington Rand Inc. D76, 77

Cash Registers

National Cash Register Co. D74

Casters

Bassick Company Dc/5
Buckeye Glide Co. D40
Colson Corporation E22
Faultless Caster Corporation D41
Kentile, Inc. Ba/2

Caulking Compounds & Cement Seals

Empire Varnish Company H7
Hillyard Chemical Company ... H10, 11
Horn Corporation, A. C. Ah/1
Legge Company, Inc. H16
Multi-Clean Products, Inc. H18, 19
Structural Waterproofing Corp. A33
United States Stoneware Co. F31

Ceiling Slabs

Insulrock Corporation A18

Ceiling Tile (see Tile—Acoustical)

Ceiling & Floor Structure

Laclede Steel Company A13
Lexit Systems, Inc. B28
Natco Corporation B19
Robertson Company, H. H. Aa/2

Ceilings—Acoustical (see Acoustical Materials)

Ceramic Furnaces (see Furnaces for Ceramics & Metals)

Chair-Desk Combination

American Seating Company Dc/1
Arlington Seating Company D44, 45
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
Norcor Manufacturing Company D51
Rowles Co. D52
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Chair Glides & Casters

Bassick Company Dc/5
Buckeye Glide Co. D40
Colson Corporation E22
Faultless Caster Corporation D41
Kentile, Inc. Ba/2

Chair Trucks (see Trucks—Book, Chair, etc.)

Chairs—Auditorium, Classroom, etc.

American Seating Company Dc/1
Arlington Seating Company ... D44, 45
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
National School Furniture Co. Dc/3
Norcor Manufacturing Company D51
Rowles Co. D52
School Interiors Co. D53
Seats & Desks, Inc. D54
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Chairs—Dormitory

Carrom Industries, Inc. E39
Knoll Associates, Inc. D48, 49
Simmons Company E34, 35
Superior Sleeprite Corp. E36, 37

Chairs—Folding

American Seating Company Dc/1
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
Lyon Metal Products, Inc. F64, 65
Mutschler Brothers Company Ec/2
Norcor Manufacturing Company D51
Rowles Co. D52
Shwayder Bros., Inc. D64
Virco Mfg. Corporation Dc/4

Chairs—Life Guard

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24

Chairs—Office & Library

All-Steel Equipment Inc. D67
American Seating Company Dc/1
Arlington Seating Company D44, 45
Art Metal Construction Co. De/1
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
National School Furniture Co. Dc/3
Norcor Manufacturing Company D51
Seats & Desks, Inc. D54
Sjostrom Co., Inc., John E. D66
Standard Pressed Steel Co. F60
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Chairs—Stack

Brunswick-Balke-Collender Co. D42
Rowles Co. D52
School Interiors Co. D53

Chairs—Tablet Arm

American Seating Company Dc/1
Arlington Seating Company D44, 45
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
Norcor Manufacturing Company D51
Rowles Co. D52
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Chalkboard Eraser Cleaners—Vacuum

Spencer Turbine Company H20

Chalkboard Resurfacers

Endur Paint Company, Inc. Al/1

Chalkboard Troughs & Trim

Inland Steel Products Company B38
Loxit Systems, Inc. B40
Rowles Co. B42

Chalkboards

Bangor Cork Co. B36
Claridge Products & Equipment Inc. .. B37
Jecmen Company B39
Loxit Systems, Inc. B40
Moduwall, Inc. Bh/1
Pennsylvania Slate Producers Guild Inc. B41
Rowles Co. B42
United States Plywood Corp. B45

Chandeliers

General Lighting Company, Inc. C46, 47

Check Room Equipment

Borroughs Manufacturing Company . D26
Nelson Co., Inc., A. R. B50
Vogel-Peterson Company Db/1

Chemical Stoneware—Acid-Proof (see Stoneware—Acid-Proof)

Child Accounting Records

Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
Remington Rand Inc. D76, 77

Chisels (see Tools—Hand)

Chlorine Control Apparatus and Chlorine

Mathieson Chemical Corporation ... G26
Wallace & Tiernan G27

Choral Stands

Horn Div., Brunswick-Balke-Collender Co. Bg/1
Mitchell Mfg. Co. D60, 61
Playtime Equipment Corp. G10
Wenger Music Equipment Company .. D65

Circular Saws—Tilting Arbor (see Saws—Band, Circular, Scroll, etc.)

Classroom Seating (see Chairs)

Clay Tile—Structural (see Structural Tile)

Cleaners—Swimming Pool

American Playground Device Co. G22, 23
Spencer Turbine Company H20

Cleaners—Vacuum (see Vacuum Cleaners)

Cleaning Compounds

Continental Car-Na-Var Corp. H6
Fuller Brush Company H8
Hillyard Chemical Co. H10, 11
Huntington Laboratories, Inc. H14
Kentile, Inc. Ba/2
Legge Co., Inc. H16
Mathieson Chemical Corporation ... G26
Multi-Clean Products, Inc. H18, 19

Cleaning Contractors

Structural Waterproofing Corp. A33
Western Waterproofing Co., Inc. A35

Climbing Apparatus

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24
Recreation Equipment Corp. G25

Clocks

General Electric Company Ec/1
Graybar Electric Company, Inc. C54
International Business Machines Corp. Cg/1
Montgomery Mfg. Co. C55
Simplex Time Recorder Co. Cg/3
Standard Electric Time Company ... Cg/2

Clothes Dryers (see Dryers—Clothes)

Coal Tar Products

Jennison-Wright Corporation Ba/1

Coat & Hat Racks

Borroughs Manufacturing Company .. D26
Moduwall, Inc. Bh/1
Nelson Co., Inc. A. R. B50
Vogel-Peterson Company Db/1

Coffee Filter Paper

Eaton-Dikeman Co. Fa/2

Coffee Urns

Blickman, Inc., S. E20
Van Range Co. E32

Colorometers (see Photo-electric Units)

Combination Locks (see Locks—Combination & Key)

Comparators—Electronics Laboratory

General Electric Company F10-16

Concrete Reinforcing Materials

Laclede Steel Company A13
Truscon Steel Div., Republic Steel A26, 27

Concrete Stadiums (see Grandstands)

Condensers

General Electric Company F10-16
Westinghouse Electric Corporation . Fa/1

Conservatories & Greenhouses

Lord and Burnham F32

Conveyors & Lifts

Sedgwick Machine Works E26

Cooking Equipment & Utensils

Aluminum Cooking Utensil Company E18, 19
Cleveland Range Co. E21
General Electric Company Ec/1
Market Forge Company Eb/4
Van Range Co. E32

Cork Bulletin Boards

Bangor Cork Co. B36
Claridge Products & Equipment Inc. . B37
Jecmen Company B39
Loxit Systems, Inc. B40
Rowles Co. B42

Corrosion-Proof Paints (see Paints—Cement, Rust-Proof & Wall)

Counter Tops (see Tops—Counter, Table & Desk)

Cove Base

Congoleum Nairn, Inc. B11
Inland Steel Products Company B38
Kentile, Inc. Ba/2
Robbins Floor Products, Inc. Ba/3

Creosote Oil

Jennison-Wright Corporation Ba/1

Cross Ties

Jennison-Wright Corporation Ba/1

Curb Bars

Alberene Stone Corp. of Virginia ... A12
American Abrasive Metals Co. .. B14, 15
American Mason Safety Tread Co. .. B13
Wooster Products, Inc. B17

Curtain Hoists, Tracks & Controls

Automatic Devices Company D28
Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. D39

Curtains—Asbestos (see Asbestos Curtains)

Curtains & Draperies—Stage & Window

Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Custodial Supplies (see Janitors' Supplies)

Cutlery

Aluminum Cooking Utensil Company E18, 19

Cutters—Food

Toledo Scale Company E27
Universal Industries E30

Cutters—Gear & Milling

Brown & Sharpe Mfg. Co. F39-42
Cincinnati Milling Machine Co. .. F43-44
LeBlond Machine Tool Co. F52
Niagara Machine & Tool Works F54

Cycloramas

Automatic Devices Company D28
Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Deodorants

Hillyard Chemical Company ... H10, 11
Huntington Laboratories, Inc. H14
Mathieson Chemical Corporation ... G26

Desk-Chair Combination

American Seating Company Dc/1
Arlington Seating Company D44, 45
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
Norcor Manufacturing Company D51
Rowles Co. D52
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Desk Tops

Fiberesin Plastics Company D56
Formica Company D57
General Electric Company Dc/6
National School Furniture Co. Dc/3
United States Plywood Corp. E31

Desks—Charging

Art Metal Construction Co. De/1
Globe-Wernicke Co. D70, 71
Sjostrom Co., Inc., John E. D66

Desks—Classroom

All-Steel Equipment Inc. D67
American Seating Company Dc/1
Arlington Seating Company D44, 45
Brunswick-Balke-Collender Co. D42
Desks of America, Inc. D43
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
National School Furniture Co. Dc/3
Norcor Manufacturing Company D51
Rowles Co. D52
School Interiors Co. D53
Seats & Desks, Inc. D54
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Desks—Dormitory

Carrom Industries, Inc. E39
Heywood-Wakefield Company .. D46, 47
Jamestown-Sterling Corporation E38
Knoll Associates, Inc. D48, 49
National School Furniture Co. Dc/3
Simmons Company E34, 35
Superior Sleeprite Corp. E36, 37

Desks—Instructors'

Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. ... F26, 27

Desks—Office

All-Steel Equipment Inc. D67
Art Metal Construction Co. De/1
Globe-Wernicke Co. D70, 71
Remington Rand Inc. D76, 77
Republic Steel, Berger Mfg. Div. F63
Rowles Co. D52

Desks—Stack

Brunswick-Balke-Collender Co. D42
Rowles Co. D52
School Interiors Co. D53

Desks—Typewriter (see Typewriter Desks)

Destructors—Garbage & Waste

General Electric Company Ec/1
Morse Boulger Destructor Co. C29

Detergents

Hillyard Chemical Company ... H10, 11
Huntington Laboratories, Inc. H14
Legge Company, Inc. H16
Mathieson Chemical Corporation ... G26

Dimmers

Adam Electric Co., Frank D27
Capitol Stage Lighting Co. D29
Century Lighting, Inc. Db/5
Federal Electric Products Co. F17
General Electric Company D32
Hub Electric Company D33
Kliegl Bros. Db/2
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Ward Leonard Electric Co. D38
Wood Brothers & Associates, Inc. ... D39

Dining Hall Equipment

Boonton Molding Company E12
Corning Glass Works E14, 15
Keyes Fibre Sales Corporation E16
National School Furniture Co. Dc/3
Schieber Sales Company Ea/1

Directories (see Bulletin & Directory Boards)

Disconnecting & Lowering Hangers

Thompson Electric Company C52

Discs—Recording

Presto Recording Corporation D23

Dish Scrapper

Toledo Scale Company E27
Universal Dishwashing Machinery Co. E29

Dishes

Boonton Molding Company E12
Corning Glass Works E14, 15
Keyes Fibre Sales Corporation E16

Dishwashing Machines

Blakeslee & Co., G. S. E17
Colt's Manufacturing Company Eb/2
General Electric Company Ec/1
Toledo Scale Company E27
Universal Dishwashing Machinery Co. E29

Disinfectants

Hillyard Chemical Company H10, 11
Huntington Laboratories Inc. H14
Mathieson Chemical Corporation G26

Dispensers—Soap (see Soap Dispensers)

Display Cases (see Cases—Museum & Display)

Diving Boards

American Playground Device Co.. G22, 23
General Playground Equipment, Inc. G24
Hussey Mfg. Co., Inc. G5
Recreation Equipment Corp. G25

Domestic Science Equipment (see Homemaking Furniture & Equipment)

Door Closers

Glynn-Johnson Corporation Bk/5
Norton Door Closer Co. B51
Rixson Co., Oscar C. Bk/3
Yale & Towne Mfg. Co. Bk/4

Door Kicks & Push Plates

Michaels Art Bronze Co., Inc. B56

Door Locks

Dudley Lock Corporation F72
Master Lock Company F73
National Lock Company F74
Yale & Towne Mfg. Co Bk/4

Door Pulls & Bars

Michaels Art Bronze Co,. Inc. B56
Sargent & Greenleaf, Inc. B52, 53
Yale & Towne Mfg. Co. Bk/4

Door Saddles & Sills

Accurate Metal Weather Strip Co., Inc. A36
Alberene Stone Corp. of Virginia ... A12
American Abrasive Metals Co. .. B14, 15
American Mason Safety Tread Co. .. B13
Wooster Products Inc. B17

Door Stops & Holders
Glynn-Johnson Corporation Bk/5
Yale & Towne Mfg. Co. Bk/4

Door Tracks
Richards-Wilcox Mfg. Co. B48, 49
Stanley Works B55

Doors—Access
Inland Steel Products Company B38

Doors—Aluminum
Cupples Products Corporation Ad/8
General Bronze Corporation Ad/4
Marmet Corporation Ad/7

Doors—Bronze
General Bronze Corporation Ad/4
Michaels Art Bronze Co., Inc. B56

Doors—Casement (see Casements—Door & Window)

Doors—Entrance
General Bronze Corporation Ad/4
Michaels Art Bronze Co. Inc. B56

Doors—Fire (see Fire Doors)

Doors—Steel
General Bronze Corporation Ad/4

Doors—Sliding & Upward Rolling
Cornell Iron Works, Inc. B43
Kinnear Manufacturing Co. B46
New Castle Products, Inc. Bg/3
Richards-Wilcox Mfg. Co. B48, 49

Doors—Vault
Diebold, Inc. D68, 69
Mosler Safe Company D78

Doors—Wood
United States Plywood Corp. B44

Dormitory Furniture
Carrom Industries, Inc. E39
Jamestown-Sterling Corporation E38
Knoll Associates, Inc. D48, 49
Simmons Company E34, 35
Superior Sleeprite Corp. E36, 37

Dough Rolling Machine
Anetsberger Brothers, Inc. Eb/1

Drafting Tables (see Tables—Art & Drafting)

Drainage Pipe & Fittings (see Pipe & Fittings)

Draperies & Curtains—Stage & Window
Knoxville Scenic Studios D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Dressers (see Dormitory Furniture)

Drill Stands & Presses
Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Cincinnati Lathe & Tool Co. F48, 49
Dure Metal Products Company F50
Millers Falls Company F36
Shopmaster, Inc. F56
South Bend Lathe Works F57
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

Drills—Portable Electric
Black & Decker Mfg. Co. F45
Millers Falls Company F36

Drills—Hand
Greenlee Tool Co. F34
Millers Falls Company F36
Stanley Tools F37

Drinking Fountains
Bradley Washfountain Co. Cc/1
Century Brass Works, Inc. C34
Cordley & Hayes C35
Crane Co. C30, 31
Taylor Co., Halsey W. C33

Dryers—Clothes
General Electric Company Ec/1

Dryers for Hands & Hair
Electric-Aire Engineering Corp. C36

Dumbwaiters
Sedgwick Machine Works E26

Duplicator Supplies
Remington Rand Inc. D76, 77

Dynamometers (see Galvanometers & Dynamometers)

Earthenware—Acid-Resisting (see Stoneware)

Ejectors—Sewage
Nash Engineering Company C26

Electric Floor Sanders (see Sanders)

Electric Floor Scrubbing-Polishing Machines
Advance Floor Machine Company ... H3
American Floor Surfacing Machine Co. H4
Clarke Sanding Machine Company ... H5
Continental Car-Na-Var Corp. H6
General Floorcraft, Inc. H9
Hild Floor Machine Company H12
Holt Manufacturing Company H13
Huntington Laboratories, Inc. H14
Kent Company, Inc. H15
Lincoln-Schlueter Floor Machinery Co. H17
Multi-Clean Products, Inc. H18, 19
United Floor Machine Company, Inc. H21

Electric Hair & Hand Dryers (see Dryers)

Electric Heat Treating Furnaces (see Furnaces for Ceramics & Metals)

Electric Scoreboards & Timers
All-American Scoreboard Corp. G17
Brown Company, M. D. G16
Fair Play Mfg. Co. G18
International Business Machines Corp. Cg/1
Medart Products, Inc. G6, 7
Naden & Sons Electric Scoreboard Co. G19

Electric Storage Batteries
Electric Storage Battery Co. C53
Graybar Electric Company, Inc. C54

Electric Time Systems (see Time Recorders, Stamps & Time-keeping Systems)

Electric Tools (see Tools—Electric)

Electric Typewriters (see Typewriters)

Electrical Measuring Instruments
Brown & Sharpe Mfg. Co. F39–42
General Electric Company F10–16
Graybar Electric Co., Inc. C54
Klett Manufacturing Co. F24, 25
Radio Corp. of America D17–22
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Electronic Equipment
Brown & Sharpe Mfg. Co. F39–42
General Electric Company F10–16
Radio Corp. of America D17–22
Westinghouse Electric Corp. Fa/1
Weston Electrical Instrument Corp. F19–22

Electrophoresis Apparatus
Klett Manufacturing Co. F24, 25

Elevator Door Sills (see Treads)

Elevators & Conveyors
Sedgwick Machine Works E26

Emergency Lighting Systems (see Lighting Systems—Emergency)

Entrance Mats (see Mats)

Exit Bolts & Fixtures
Sargent & Greenleaf, Inc. B52, 53
Vonnegut Hardware Co., Von Duprin Div. B54
Yale & Towne Mfg. Co. Bk/4

Exit Signs (see Signs)

Expansion Joint Material
Barrett Div., Allied Chemical & Dye Corp. A15
Inland Steel Products Company B38
Jennison-Wright Corporation Ba/1

Fans—Exhaust & Ventilating

Laboratory Furniture Co., Inc. ... F26, 27
Metalab Equipment Corp. F28, 29
Swartwout Company C27
Trane Company C24, 25

Fencing—Iron and Chain Link

Anchor Post Products, Inc. H27
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H23
Continental Steel Corporation H24
Cyclone Fence Dept., United States Steel Corporation H25
Stewart Iron Works Co. H26

Fenestration Systems (see Windows)

Field Houses & Gymnasium Construction

Macomber Incorporated A14
Rilco Laminated Products, Inc. .. A16, 17

Filing Cabinets

All-Steel Equipment Inc. D67
Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Lyon Metal Products, Inc. F64, 65
Mosler Safe Company D78
Remington Rand Inc. D76, 77
Republic Steel, Berger Mfg. Div. F63
Rowles Co. B42
Wood-Metal Industries, Inc. Ec/3

Filing Stands—Rotary

Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
Remington Rand Inc. D76, 77

Filing Systems & Supplies

Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
International Business Machines Corp. Cg/1
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Non-Slip Troweling Compounds

American Abrasive Metals Co. .. B14, 15
American Bitumuls & Asphalt Company H34

Nurseries & Greenhouses

Lord and Burnham F32

Office Furniture (see Furniture—Office and Library)

Office Machines
International Business Machines Corp. Cg/1
National Cash Register Co. D74
Underwood Corporation D72, 73

Office Supplies
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
National Cash Register Co. D74
Remington Rand Inc. D76, 77
Underwood Corporation D72, 73

Oil Burners
Babcock & Wilcox Company C9
Farrar & Trefts, Inc. C13
International Boiler Works Co. C16
Orr & Sembower, Inc. Ca/3
Petro C20, 21
Smith Co., Inc., H. B. Ca/4
Titusville Iron Works, Div. Struthers Wells Corp. C22, 23

Optical Products
American Optical F8, 9

Orchestra Lifts
Knoxville Scenic Studios, Inc. D34

Organs, Symphonic
Baldwin Piano Company D24, 25

Oscillators
Radio Corp. of America D17–22

Oscillographs (see Recorders & Controllers)

Oscillometers (see Meters)

Ottomans (see Dormitory Furniture)

Outlet Plates & Boxes
Adams Electric Co., Frank D27
Century Lighting, Inc. Db/5
Federal Electric Products Co. F17
General Electric Company F10–16
Graybar Electric Co., Inc. C54
Hub Electric Company D33
Kliegl Bros. Db/2

Ovens—Electric
General Electric Company Ec/1
Graybar Electric Co., Inc. C54

Ovens—Gas
Van Range Co. E32

Padlocks
Dudley Lock Corporation F72
Master Lock Company F73
National Lock Company F74
Sargent & Greenleaf, Inc. B52, 53
Yale & Towne Mfg. Co. Bk/4

Paint—Cement, Protective, Rustproof and Wall
Barrett Div., Allied Chemical & Dye Corp. A15
Empire Varnish Company H7
Standard Dry Wall Products Ah/2

Paint—Chalkboard
Endur Paint Company, Inc. Ai/1

Paint—Interior, Exterior
Empire Varnish Company H7
Endur Paint Company, Inc. Ai/1

Paint Products
Empire Varnish Company H7
Endur Paint Company, Inc. Ai/1

Panel & Switchboard Instruments (see Switches & Panel Boards)

Paneling
Johns-Manville B23–26
Natco Corporation B19
United States Plywood Corp. B18; B44, 45
United States Quarry Tile Co. B22

Panic Exit Devices
Sargent & Greenleaf, Inc. B52, 53
Vonnegut Hardware Co., Von Duprin Div. B54

Paper Dishes
Keyes Fibre Sales Corporation E16

Papers—Filter
Eaton-Dikeman Co. Fa/2

Parking Meters
Michaels Art Bronze Co., Inc. B56

Partition Panels—Load Bearing
Macomber Incorporated A14
Natco Corporation B19

Partitions—Folding, Movable
Cornell Iron Works, Inc. B43
Fairhurst Co. Inc., John T. B30, 31
Horn Div., Brunswick-Balke-Collender Co. Bg/1
Johns-Manville B23–26
Kinnear Manufacturing Co. B46
New Castle Products, Inc. Bg/3
Richards-Wilcox Mfg. Co. B48, 49
United States Plywood Corp. B44
Wayne Iron Works B34, 35

Partitions—Glass Block
Pittsburgh Corning Corp. A19; 32
Kimble Glass Co., Owens-Illinois ... A31

Partitions—Office & Classroom
Fairhurst Co. Inc., John T. B30, 31
Globe-Wernicke Co. D70, 71
Johns-Manville B23–26
New Castle Products, Inc. Bg/3
Richards-Wilcox Mfg. Co. B48, 49
United States Plywood Corp. B44
Wayne Iron Works B34, 35

Partitions—Tile
Metropolitan Brick, Inc. Bc/1
Natco Corporation B19

Partitions—Toilet & Shower
Pennsylvania Slate Producers Guild, Inc. B41
Sanymetal Products Co., Inc. ... B32, 33

Pavements, Walks, Treading, etc.
American Bitumuls & Asphalt Company H34
Barrett Div., Allied Chemical & Dye Corp. A15

Peelers—Vegetable
Blakeslee & Co., G. S. E17
Colt's Manufacturing Company Eb/2
Gifford-Wood Co. E24
Toledo Scale Company E27
Universal Industries E30

Pharmaceutical Laboratory Equipment
Klett Manufacturing Co. F24, 25

Pharmaceutical Supplies
Corning Glass Works F7
Eaton-Dikeman Co. Fa/2

Phonographs (see Record Players)

Photoelectric Units
General Electric Company F10-16
Klett Manufacturing Co. F24, 25
Weston Electrical Instrument Corp. F19–22

Photoreproduction Equipment
Diebold, Inc. D68, 69
Remington Rand Inc. D76, 77

Piano Casters (see Casters)

Pianos
Baldwin Piano Company D24, 25

Piling
Jennison-Wright Corporation Ba/1

Pipe & Fittings
Bradley Washfountain Co. Cc/1
Century Brass Works, Inc. C34
Crane Co. C30, 31
Knight, Maurice A. Fb/1

Pipe & Fittings—Acid-Proof
Knight, Maurice A. Fb/1
United States Stoneware Co. F31

Pivot Hinges
Rixson Co., Oscar C. Bk/3

Planes (see Tools)

Planfiles
Globe-Wernicke Co. D70, 71
Remington Rand Inc. D76, 77
Sjostrom Co., Inc., John E. D66

Plaques—Wall
Michaels Art Bronze Co., Inc. B56
Spencer Industries Inc. B57
Stewart Iron Works Co. H26
United States Bronze Sign Co., Inc. .. B58

Plastic Covering For Wall & Furniture
United States Plywood Corporation . B18

Plastics—Laminated, for Table, Counter & Desk Tops
Fiberesin Plastics Company D56
Formica Company D57
General Electric Company Dc/6
National School Furniture Co. Dc/3

Plate Glass
Libbey-Owens-Ford Glass Company. Ad/6

Platforms & Stands—Folding (see Stands, Platforms & Stages—Folding)

Playground Equipment
American Playground Device Co. G22, 23
General Playground Equipment Inc... G24
Medart Products, Inc. G6, 7
Recreation Equipment Corp. G25

Plumbing Supplies
Bradley Washfountain Co. Cc/1
Century Brass Works, Inc. C34
Crane Co. C30, 31
Lawler Automatic Controls, Inc. C37
Symmons Engineering Company C38

Polish—Furniture & Metal
Fuller Brush Company H8
Hillyard Chemical Company H10, 11

Polish—Porcelain (see Porcelain Polish)

Polishers—Floor (see Floor Machines)

Pool Cleaning Equipment (see Cleaners—Swimming Pool)

Porcelain Polish
Hillyard Chemical Company H10, 11
Huntington Laboratories, Inc. H14

Portable Bleachers (see Bleachers)

Portable Typewriters (see Typewriters)

Posts—Terminal
Anchor Post Products, Inc. H27
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H23
Continental Steel Corporation H24
Cyclone Fence Dept., United States Steel Corporation H25
Stewart Iron Works Co. H26

Potentiometers
General Electric Company F10–16
Westinghouse Electric Corporation . Fa/1
Weston Electrical Instrument Corp. F19–22

Pots and Pans
Aluminum Cooking Utensil Company E18, 19

Potters Wheels
Electrikiln Div., Harrop Ceramic Service Co. F61
Perony Equipment Company F62

Power Lawn Mowers
Devere Company H28
Eclipse Lawn Mower Co. H29
Gravely Tractors, Incorporated H30
Worthington Mower Company H31
Yazoo Manufacturing Company . H32, 33

Power Sweepers
Gravely Tractors, Incorporated H30

Power Ventilators
Knight, Maurice A. Fb/1
Swartwout Company C27

Pressure Equalizers—Water
Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company C38

Program Clocks
International Business Machines Corp. Cg/1
Montgomery Mfg. Co. C55
Simplex Time Recorder Co. Cg/3
Standard Electric Time Company ... Cg/2

Projection Instruments—Laboratory
American Optical F8, 9
Weston Electrical Instrument Corp. F19–22

Projectors—Motion Picture
Radio Corp. of America D17–22

Projectors—Opaque
American Optical D11
Beseler Co., Charles D13

Projectors—Slide & Film
American Optical D11
Automatic Projection Corp. D12
Beseler Co., Charles D13
DuKane Corporation D14, 15
Strong Electric Corporation D37

Public Address Systems
Bogen Company Inc., David ... D30, 31
DuKane Corporation D14, 15
Graybar Electric Co., Inc. C54
Radio Corp. of America C17–22

Pulleys for Lowering Lighting Fixtures
Thompson Electric Company C52

Pulverizers (see Destructors)

Pumps—Centrifugal
Nash Engineering Company C26

Pumps—Vacuum Heating
Nash Engineering Company C26

Racks—Basket, Gym, etc.
American Playground Device Co. G22, 23
Interior Steel Equipment Co. F70
Medart Products, Inc. F66, 67

Racks—Bicycle (see Bicycle Racks)

Racks—Clothing
Borroughs Manufacturing Company . D26
Nelson Company, Inc., A. R. B50
Vogel-Peterson Company Db/1

Racks—Tool
Lyon Metal Products, Inc. F64, 65
Republic Steel, Berger Mfg. Div. F63
Standard Pressed Steel Co. F60

Radiator Panels & Cabinets
American Air Filter Co., Inc.—Herman Nelson Ca/1
Bush Manufacturing Company C10
Nesbitt, Inc., John J. Ca/2; Ca/5
Trane Company C24, 25

Radiator Valves (see Valves—Radiator)

Radiators
American Air Filter Co., Inc.—Herman Nelson Ca/1
Bush Manufacturing Company C10
Fedders-Quigan Corporation C14
Nesbitt, Inc., John J. Ca/2; Ca/5
Trane Company C24, 25

Radio Laboratory Equipment
General Electric Company F10–16
Radio Corp. of America D17–22
Weston Electrical Instrument Corp. F19-22

Radio & Television Broadcasting Equipment
Radio Corp. of America D17–22

Radios
Radio Corp. of America D17–22

Railings—Bronze, Metal, etc.
General Bronze Corporation Ad/4
Michaels Art Bronze Co., Inc. B56

Ranges—Electric
General Electric Company Ec/1
Graybar Electric Co., Inc. C54

Ranges—Gas
Van Range Co. E32

Receptacles—Waste
Bennett Manufacturing Co. G28
National Vulcanized Fibre Co..... H22
Solar-Sturges Mfg. Div., Pressed Steel Car Co., Inc. G30
United Metal Box Co., Inc. G29

Record Players
Bogen Company, Inc., David .. D30, 31
Califone Corporation D16
DuKane Corporation D14, 15
Presto Recording Corporation D23
Radio Corp. of America D17–22

Record Systems
Art Metal Construction Co. De/1
Diebold, Inc. D68, 69
Globe-Wernicke Co. D70, 71
International Business Machines Corp. Cg/1
Remington Rand Inc. D76, 77

Recorders—Tape, Wire, Disc
DuKane Corporation D14, 15
Radio Corp. of America D17–22

Recorders & Controllers—Temperature, CO_2, Voltage, etc.
General Electric Company F10–16
Graybar Electric Company Inc..... C54
Klett Manufacturing Co. F24, 25
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Recording Discs
Presto Recording Corporation D23

Records for Record Players
Presto Recording Corporation D23
Radio Corp. of America D17–22

Rectifiers & Rectifier Panels

General Electric Company F10–16
Graybar Electric Co., Inc. C54
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Reflectors—Lighting

Benjamin Electric Mfg. Co. C39-41
Century Lighting, Inc. Db/5
Crouse-Hinds Co. G20
Curtis Lighting, Inc. C42, 43
General Lighting Company, Inc. C46, 47
Graybar Electric Co., Inc. C54
Guth Company, Edwin F. C45
Holophane Company, Inc. C48, 49
Kliegl Bros. Db/2
Sunbeam Lighting Company C50

Refrigerator Rack Equipment

Market Forge Company Eb/4

Refrigerators

General Electric Company Ec/1
Puffer-Hubbard Refrigeration Co. ... E25

Regulators—Steam Temperature

American Air Filter Co., Inc.—
Herman Nelson Ca/1
Fedders-Quigan Corporation C14
Gannon Co., Inc., Russell R. C15
Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company C38

Relays

General Electric Company F10–16
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Remover—Varnish & Wax

Hillyard Chemical Company H10, 11
Legge Company, Inc. H16

Resistors

General Electric Company F10–16
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Roof Arches & Construction

Laclede Steel Company A13
Macomber Incorporated A14
Rilco Laminated Products, Inc. .. A16, 17

Roof Coatings

Barrett Div., Allied Chemical & Dye Corp. A15

Roof Insulation

Insulrock Corporation A18

Roof Panels—Glass Block

Kimble Glass Co., Owens-Illinois ... A31
Pittsburgh Corning Corp. A19

Roof Slabs

Insulrock Corporation A18
Robertson Company, H. H. Aa/2

Roof Trusses—Steel (see Roof Arches & Construction)

Roof Ventilators (see Ventilators—Roof)

Roofing

American Bitumuls & Asphalt Co. .. H34
Barrett Div., Allied Chemical & Dye Corp. A15
Johns-Manville B23–26
Pennsylvania Slate Producers Guild Inc. B41
Robertson Company, H. H. Aa/2

Rotating Apparatus—Electrical Laboratory

General Electric Company F10–16

Routers—Shapers

Millers Falls Company F36

Rug Shampooing Machines

Advance Floor Machine Company ... H3
American Floor Surfacing Machine Co. H4
Clarke Sanding Machine Company ... H5
General Floorcraft, Inc. H9
Hild Floor Machine Company H12
Holt Manufacturing Company H13
Lincoln-Schlueter Floor Machinery Co. H17
Multi-Clean Products, Inc. H18, 19
United Floor Machine Company, Inc. H21

Rules & Measuring Tapes

Lufkin Rule Co. F35
Millers Falls Company F36
Stanley Tools F37
Starrett Company, L. S. F38

Runners—Safety Tread

Melflex Products Company, Inc. B16
Robbins Floor Products, Inc. Ba/3

Rustproof Paint (see Paints—Cement, Rustproof & Walls)

Safes

Mosler Safe Company D78
Remington Rand Inc. D76, 77

Sanders

Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Clarke Sanding Machine Company ... H5
Duro Metal Products Company F50
Millers Falls Company F36
Oliver Machinery Company F55
Shopmaster, Inc. F56
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

Sanders—Floor (see Floor Sanders)

Sash—Window & Door

Adams & Westlake Company Ad/1
Bayley Co., William A20, 21
Flynn Manufacturing Co., Michael A24, 25
Marmet Corporation Ad/7
Robertson Company, H. H. Aa/2
Russell Company, F. C. Ad/5
Truscon Steel Division, Republic Steel A26, 27
Windalume Corporation A23

Saws—Band, Circular, Scroll, etc.

Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Duro Metal Products Company F50
Logan Engineering Company F53
Oliver Machinery Company F55
Shopmaster, Inc. F56
Starrett Company, L. S. F38
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

Scaffolds

Safway Steel Products, Inc. G11

Scales

Toledo Scale Company E27

Scenery—Stage

Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39
Wayne Works, Inc. H35

School Records & Forms (see Filing System & Supplies)

Scoreboards

All-American Scoreboard Corp. G17
Brown Company, M. D. G16
Fair Play Mfg. Co. G18
International Business Machines Corp. Cg/1
Medart Products, Inc. G6, 7
Naden & Sons Electric Scoreboard Co. G19

Scoring & Analyzing Machines (see Test Scoring Machines)

Screwdrivers (see Tools—Hand)

Screw Machines

Brown & Sharpe Mfg. Co. F39–42

Scrubbing-Polishing Machines —Electric

Advance Floor Machine Company ... H3
American Floor Surfacing Machine Co. H4
Clarke Sanding Machine Company .. H5
Continental Car-Na-Var Corp. H6
General Floorcraft, Inc. H9
Hild Floor Machine Company H12
Holt Manufacturing Company H13
Huntington Laboratories, Inc. H14
Kent Company, Inc. H15
Lincoln-Schlueter Floor Machinery Co. H17
Multi-Clean Products, Inc. H18, 19
United Floor Machine Company, Inc. H21

Seals—Floor

Continental Car-Na-Var Corp. H6
Empire Varnish Company H7
Hillyard Chemical Company H10, 11
Huntington Laboratories, Inc. H14
Jennison-Wright Corporation Ba/1
Legge Company, Inc. H16
Multi-Clean Products, Inc. H18, 19

Seating—Auditorium, Classroom, etc. (see Chairs)

Seating—Grandstand & Bleacher

American Bridge (Div. United States Steel Corporation) G3
Castadia Inc. G4
Horn Div., Brunswick-Balke-Collender Co. Bg/1
Hussey Mfg. Co., Inc. G5
Long Island Bleacher Co., Inc. G8
Medart Products, Inc. G6, 7
Pittsburgh-Des Moines Steel Co. G9
Playtime Equipment Corp. G10
Safway Steel Products, Inc. G11
Snyder Tank Corp. G12
Universal Bleacher Company G13
Wayne Iron Works G14, 15

Seesaws

American Playground Device Co. G22, 23
General Playground Equipment Inc. .. G24
Recreation Equipment Corp. G25

Settees—Campus & Park

American Playground Device Co. G22, 23
Stewart Iron Works Co. H26

Sewage Ejectors

Nash Engineering Company C26

Sewing Machines

Singer Sewing Machine Co. E33

Sewing Room Equipment

Kewaunee Manufacturing Co. F23
Mutschler Brothers Company Ec/2
Singer Sewing Machine Co. E33
Wood-Metal Industries, Inc. Ec/3

Shades—Window

Columbus Coated Fabrics Corp. A30
Joanna Western Mills Company A28, 29
Rowles Co. B42

Shapers

Atlas Press Company F46, 47
Duro Metal Products Company F50
Logan Engineering Company F53
Oliver Machinery Company F55
Shopmaster, Inc. F56
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

Sheathing

Insulrock Corporation A18

Shelving—Acid-Proof

Alberene Stone Corp. of Virginia F18
Kewaunee Manufacturing Company .. F23
Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. ... F26, 27
Pennsylvania Slate Producers Guild, Inc. B41

Shelving

Art Metal Construction Co. Da/1
Borroughs Manufacturing Company .. D26
Colonial Engineering Company Dc/7
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Lyon Metal Products, Inc. F64, 65
Market Forge Company Eb/4
Medart Products, Inc. F66, 67
Moduwall, Inc. Bh/1
Penn Metal Corp. of Penna. F68, 69
Republic Steel, Berger Mfg. Div. F63
Star Steel Equipment Co., Inc. F71

Shields for Lighting Fixtures

Benjamin Electric Mfg. Co. C39-41
Guth Company, Edwin F. C45

Shingles—Asbestos, Asphalt etc.

Barrett Div., Allied Chemical & Dye Corp. A15
Johns-Manville B23–26

Shop Equipment

Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Brown & Sharpe Mfg. Co. F39–42
Cincinnati Lathe & Tool Co. F48, 49
Cincinnati Milling Machine Co. .. C43, 44
Columbian Vise & Mfg. Co. F33
Duro Metal Products Company F50
Electrikiln Div., Harrop Ceramic Service Co. F61
General Electric Company F10–16
Greenlee Tool Co. F34
Klett Manufacturing Co. F24, 25
LeBlond Machine Tool Co. F52
Logan Engineering Company F53
Lufkin Rule Co. F35
Lyon Metal Products, Inc. F64, 65
Millers Falls Company F36
Niagara Machine & Tool Works F54
Oliver Machinery Company F55
Pereny Equipment Company F62
Shopmaster, Inc. F56
South Bend Lathe Works F57
Standard Pressed Steel Co. F60
Stanley Tools F37
Star Steel Equipment Co., Inc. F71
Starrett Company, L. S. F38
Walker-Turner Div., Kearney & Trecker Corp. F58, 59
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Shower Compartments

Bradley Washfountain Co. Cc/1
Pennsylvania Slate Producers Guild, Inc. B41
Sanymetal Products Co., Inc. B32–33

Shower Fittings

Bradley Washfountain Co. Cc/1
Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company C38

Shower Temperature Regulating Valves

Bradley Washfountain Co. Cc/1
Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company C38

Shutters—Fire; Upward Rolling Doors

Cornell Iron Works, Inc. B43
Kinnear Manufacturing Co. B46

Signal Systems

Bogen Company, Inc., David ... D30, 31
DuKane Corporation D14, 15
Graybar Electric Co., Inc. C54
International Business Machines Corp. Cg/1
Montgomery Mfg. Co. C55
Simplex Time Recorder Co. Cg/3
Standard Electric Time Company ... Cg/2

Signs & Lettering

Michaels Art Bronze Co., Inc. B56
Spencer Industries Inc. B57
United States Bronze Sign Co., Inc. . B58

Signs & Tablets—Bronze (see Bronze Tablets & Signs)

Signs—Electric

Century Lighting, Inc. Db/5
Hub Electric Company D33

Sills—Door & Window

Alberene Stone Corp. of Virginia ... A12
American Abrasive Metals Co. .. B14, 15
American Mason Safety Tread Co. .. B13
Inland Steel Products Company B38
Pennsylvania Slate Producers Guild, Inc. B41
Wooster Products, Inc. B17

Silverware

International Silver Company E13

Sink & Shelf Unit—Classroom

Colonial Engineering Company Dc/7

Sinks—Kitchen

Blickman, Inc., S. E20
Crane Co. C30, 31
General Electric Company Ec/1
Kewaunee Manufacturing Co. F23
Lyon Metal Products, Inc. F64, 65
Van Range Co. E32

Sinks—Laboratory

Alberene Stone Corp. of Virginia ... F18
Kewaunee Manufacturing Co. F23
Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. ... F26, 27
Metalab Equipment Corp. F28, 29
Sjostrom Co., Inc., John E. F30
United States Stoneware Co. F31

Sinks—Lavatory

Bradley Washfountain Co. Cc/1
Crane Co. C30, 31

Skylights

Kimble Glass Co., Owens-Illinois ... A31
Pittsburgh Corning Corp. A19
Robertson Company, H. H. Aa/2

Slate Chalkboards

Pennsylvania Slate Producers Guild, Inc. B41

Slicing Machines

Toledo Scale Company E27

Slide Films (see Films, Film Slides, Film Strips)

Slide Projectors (see Projectors —Slide & Film)

Slides—Playground

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24
Recreation Equipment Corp. G25

Snow Removal Equipment

Gravely Tractors, Incorporated H30

Soap Dispensers

Bradley Washfountain Co. Cc/1

Soaps

Hillyard Chemical Company H10, 11
Huntington Laboratories, Inc. H14

Soapstone

Alberene Stone Corp. of Virginia .. A12

Sound Deadening Materials (see Acoustical Materials)

Sound Systems

Bogen Company, Inc., David .. D30, 31
Califone Corporation D16
DuKane Corporation D14, 15
Graybar Electric Company C54
Radio Corp. of America D17–22

Spectrographic Equipment

American Optical F8, 9

Sports Timing Equipment

All-American Scoreboard Corp. G17
Brown Company, M. D. G16
Fair Play Mfg. Co. G18
International Business Machines Corp. Cg/1
Medart Products, Inc. G6, 7
Naden & Sons Electric Scoreboard Co. G19

Spotlights

Capitol Stage Lighting Co. D29
Century Lighting, Inc. Db/5
Hub Electric Company D33
Kliegl Bros. Db/2
Northwest Studios, Inc. D35
Pittsburgh Stage, Inc. D36
Strong Electric Corporation D37
Wood Brothers & Associates, Inc. ... D39

Sprinklers—Automatic Fire

Grinnell Company C32

Stacks—Book

Art Metal Construction Co. De/1
Borroughs Manufacturing Company . D26
Globe-Wernicke Co. D70, 71
Interior Steel Equipment Co. F70
Penn Metal Corp. of Penna. F68, 69
Remington Rand Inc. F76, 77
Republic Steel, Berger Mfg. Div. F63
Sjostrom Co., Inc., John E. D66
Star Steel Equipment Co., Inc. F71

Stadium Construction (see Grandstands)

Stadium Seat Brackets

Stewart Iron Works Co. H26

Stadium Seating (see Bleachers & Grandstands)

Stage Curtains (see Curtains & Draperies)

Stage Equipment—Electrical

Century Lighting, Inc. Db/5
Hub Electric Company D33
Kliegl Bros. Db/2
Knoxville Scenic Studios Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Stage Equipment, Rigging & Hardware

Automatic Devices Company D28
Knoxville Scenic Studios Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Stage Lighting Apparatus & Supplies

Adam Electric Co., Frank D27
Capitol Stage Lighting Co. D29
Century Lighting, Inc. Db/5
Federal Electric Products Co. F17
General Electric Company D32
General Lighting Company, Inc. . C46, 47
Hub Electric Company D33
Kliegl Bros. Db/2
Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Strong Electric Corporation D37
Ward Leonard Electric Co. D38
Wood Brothers & Associates, Inc. ... D39

Stage Props

Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Wood Brothers & Associates, Inc. ... D39

Stage Scenery

Knoxville Scenic Studios, Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Wood Brothers & Associates, Inc. ... D39

Stage Ventilators

Swartwout Company C27

Stages—Folding (see Stands, Platforms & Stages)

Stair Treads—Non-Slip

Alberene Stone Corp. of Virginia ... A12
American Abrasive Metals Co. .. B14, 15
American Mason Safety Tread Co. ... B13
Melflex Products Company, Inc. B16
Robbins Floor Products, Inc. Ba/3
Wooster Products, Inc. B17

Standards For Mounting Chalkboards, etc.

Moduwall, Inc. Bh/1

Stands—Tool (see Drill Stands)

Stands, Platforms & Stages Folding

Horn Div., Brunswick-Balke-Collender Co. Bg/1
Mitchell Mfg. Co. D60, 61
Playtime Equipment Corp. G10
Wenger Music Equipment Company .. D65

Steam Cookers

Cleveland Range Co. E21
Market Forge Company Eb/4

Steam Generators

Cyclotherm Div., U. S. Radiator Corp. C12

Steam Tables

Anetsberger Brothers, Inc. Eb/1
Blickman, Inc., S. E20
National Cornice Works Eb/3
Van Range Co. E32

Steel Flagpoles (see Flagpoles)

Steel Framing—Building

Macomber Incorporated A14

Steel Grandstands (see Grandstands)

Steel Roof Construction (see Roof Arches & Construction)

Stokers—Automatic

Combustioneer Div., Steel Products Engineering Company C11
Will-Burt Company C28

Stone—Architectural

Alberene Stone Corp. of Virginia ... A12

Stoneware—Acid-Proof

Alberene Stone Corp. of Virginia F18
Knight, Maurice A. Fb/1
United States Stoneware Co. F31

Stools

Lyon Metal Products, Inc. F64, 65
Standard Pressed Steel Co. F60

Storage Batteries

Electric Storage Battery Co. C53
Graybar Electric Co., Inc. C54

Storage Counters—Cubicles—Classroom

Colonial Engineering Company Dc/7

Stoves (see Ranges)

Structural Slabs

Insulrock Corporation A18

Structural Tile

Metropolitan Brick, Inc. Bc/1
Mosaic Tile Company B20, 21
Natco Corporation B19
United States Quarry Tile Co. B22

Student Record Reproduction Equipment (see Photo-reproduction Equipment)

Student Records (see Record Systems)

Sumps & Catch Basins—Acid-Proof

Alberene Stone Corp. of Virginia F18
Knight, Maurice A. Fb/1

Surfacing Tennis Courts, Walks, etc.

American Bitumuls & Asphalt Company H34
Barrett Div., Allied Chemical & Dye Corp. A15

Sweepers—Power

Gravely Tractors, Incorporated H30

Swimming Pool Chlorination

Mathieson Chemical Corporation ... G26
Wallace & Tiernan G27

Swimming Pool Cleaning Equipment

General Playground Equipment Inc. . G24
Mathieson Chemical Corporation G26
Spencer Turbine Company H20

Swimming Pool Equipment

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24
Hussey Mfg. Co., Inc. G5
Recreation Equipment Corp. G25

Swings

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24
Recreation Equipment Corp. G25

Switches & Panelboards—Laboratory

Century Lighting, Inc. Db/5
Federal Electric Products Co. F17
General Electric Company F10–16
Westinghouse Electric Corporation .. Fa/1
Weston Electrical Instrument Corp. F19–22

Switches & Panel Boards—Lighting Control

Adam Electric Co., Frank D27
Federal Electric Products Co. F17
General Electric Company D32
Hub Electric Company D33
Kliegl Bros. Db/2
Ward Leonard Electric Co. D38

Table Tops (see Tops—Counter, Table & Desk)

Tables—All Purpose

All-Steel Equipment Inc. D67
American Seating Company Dc/1
Arlington Seating Company ... D44, 45
Brewer-Titchener Corporation D58
Brunswick-Balke-Collender Co. D42
Globe-Wernicke Co. D70, 71
Griggs Equipment Company Dc/2
Haldeman-Langford Manufacturing Co. E9
Heywood-Wakefield Company .. D46, 47
Howe Folding Furniture, Inc. D59
Irwin Seating Company D50
Kewaunee Manufacturing Co. F23
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Mitchell Mfg. Co. D60, 61
Monroe Company D63
National School Furniture Co. Dc/3
Norcor Manufacturing Company D51
Republic Steel, Berger Mfg. Div. ... F63
Rowles Co. D52
Schieber Sales Company Ea/1
School Interiors Co. D53
Sjostrom Co., Inc., John E. D66
Virco Mfg. Corporation Dc/4
Wenger Music Equipment Company . D65
Williams & Brower, Inc. D55

Tables—Art & Drafting

Desks of America, Inc. D43
Interior Steel Equipment Co. F70
Kewaunee Manufacturing Co. F23
Lyon Metal Products, Inc. F64, 65
Tolerton Company Fc/1

Tables—Banquet (see Banquet Tables)

Tables—Cafeteria

American Seating Company Dc/1
Griggs Equipment Co. Dc/2
Haldeman-Langford Manufacturing Co. E9
Howe Folding Furniture, Inc. D59
Mitchell Mfg. Co. D60, 61
National School Furniture Co. Dc/3
Rol-Fol Table, Inc. E10, 11
Schieber Sales Company Ea/1
Wenger Music Equipment Company . D65

Tables—Dormitory

Carrom Industries, Inc. E39
Jamestown-Sterling Corporation E38
Knoll Associates, Inc. D48, 49
Simmons Company E34, 35

Tables—Folding

Brewer-Titchener Corporation D58
Haldeman-Langford Manufacturing Co. E9
Howe Folding Furniture, Inc. D59
Midwest Folding Products D62
Mitchell Mfg. Co. D60
Monroe Company D63
Mutschler Brothers Company Ec/2
Norcor Manufacturing Company D51
Rol-Fol Table, Inc. E10, 11
Schieber Sales Company Ea/1
Shwayder Bros. Inc. D64
Virco Mfg. Corporation Dc/4

Tables—Kindergarten

Colonial Engineering Company Dc/1
Tolerton Company Fc/1

Tables—Kitchen

Blickman, Inc., S. E20
General Electric Company Ec/1
Mutschler Brothers Company Ec/2
National School Furniture Co. Dc/3
Wood-Metal Industries, Inc. Ec/3

Tables—Laboratory & Shop

Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. .. F26, 27
Lyon Metal Products, Inc. F64, 65
Metalab Equipment Corp. F28, 29
National School Furniture Co. Dc/3
Sjostrom Co., Inc., John E. F30

Tables—Library

All-Steel Equipment Inc. D67
Remington Rand Inc. D76, 77
Sjostrom Co., Inc., John E. D66
Federal Equipment Company D75

Tables—Picnic

American Playground Device Co. G22, 23

Tables—Round

Brunswick-Balke-Collender Co. D42
Globe-Wernicke Co. D70, 71
Griggs Equipment Company Dc/2
Mitchell Mfg. Co. D60, 61
National School Furniture Co. Dc/3
Sjostrom Co., Inc., John E. D66
Virco Mfg. Corporation Dc/4

Tables—Sewing Room (see Sewing Room Equipment)

Tables—Stack

Brunswick-Balke-Collender Co. D42
School Interiors Co. D53

Tables—Steam (see Steam Tables)

Tablet Arm Chairs

American Seating Company Dc/1
Arlington Seating Company D44, 45
Brunswick-Balke-Collender Co. D42
Griggs Equipment Co. Dc/2
Heywood-Wakefield Company .. D46, 47
Irwin Seating Company D50
Norcor Manufacturing Company D51
Rowles Co. D52
Virco Mfg. Corporation Dc/4
Williams & Brower, Inc. D55

Tablets—Memorial

Michaels Art Bronze Co., Inc. B56
Spencer Industries Inc. B57
Stewart Iron Works Co. H26
United States Bronze Sign Co., Inc. .. B58

Tableware—Dishes

Boonton Molding Company E12
Corning Glass Works E14, 15
Keyes Fibre Sales Corporation E16

Tableware—Silver

International Silver Company E13

Tabulating & Sorting Machines

International Business Machines Corp. Cg/1

Tackboards

Bangor Cork Co. B36
Claridge Products & Equipment, Inc. . B37
Jecmen Company B39
Loxit Systems, Inc. B40
Moduwall, Inc. Bh/1
Rowles Co. B42
United States Plywood Corporation . B45

Tanks—Acid & Chemical Resistant

Alberene Stone Corp. of Virginia .. F18
Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. ... F26, 27
Metalab Equipment Corp. F28, 29

Tape Recorders

DuKane Corporation D14, 15
Radio Corp. of America D17–22

Teaching Aids, Films & Booklets

Cincinnati Milling Machine Co. .. F43, 44
South Bend Lathe Works F57
Stanley Tools F37
Starrett Company, L. S. F38

Telephone Systems

Graybar Electric Co., Inc. C54

Television

Radio Corp. of America D17–22

Temperature Indicating Instruments

Weston Electrical Instrument Corp. F19–22

Temperature Regulating Systems

American Air Filter Co., Inc.—Herman Nelson Ca/1
Gannon Co., Inc., Russell R. C15
Johnson Service Company C18, 19
Powers Regulator Co. Cc/2
Trane Co. C24, 25

Temperature Regulators—Showers, Steam Tables, Oil Preheaters, etc.

Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company ... C38

Tennis Court Backstops (see Backstops)

Tennis Court Resurfacing (see Surfacing Tennis Courts, etc.)

Tennis, Volley Ball, Badminton, Nets

American Playground Device Co. G22, 23

Terminal Posts

Anchor Post Products, Inc. H27
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H23
Continental Steel Corporation H24
Cyclone Fence Dept., United States Steel Corporation H25
Stewart Iron Works Co. H26

Terrazzo

National Terrazzo & Tile Assn. Ba/5

Testing Equipment—Electrical (see Electrical Measuring Instruments)

Test Scoring Machines

International Business Machines Corp. Cg/1

Test Tubes

Corning Glass Works F7

Textbook Bindings

Holliston Mills, Inc. 1074

Theatrical Equipment

Automatic Devices Company D28
Century Lighting, Inc. Db/5
General Electric Company D32
Hub Electric Company D33
Kliegl Bros. Db/2
Knoxville Scenic Studios Inc. D34
Northwest Studios, Inc. D35
Novelty Scenic Studios, Inc. Db/4
Pittsburgh Stage, Inc. D36
Ward Leonard Electric Co. D38
Wood Brothers & Associates, Inc. ... D39

Thermocouples

Weston Electrical Instrument Corp. F19–22

Thermometers—Electrical Resistance

Weston Electrical Instrument Corp. F19–22

Thermostats—Heating & Ventilating

Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2

Thresholds (see Sills—Door & Window)

Tile—Acoustical

Celotex Corporation B27
Dant & Russell Sales Co. Be/1
Johns-Manville B23–26
Wood Conversion Company B29

Tile—Asphalt

Congoleum Nairn, Inc. B11
Johns-Manville B23–26
Kentile, Inc. Ba/2
Uvalde Rock Asphalt Company Ba/4

Tile—Flooring (see Flooring—Tile)

Tile—Glazed (see Glazed—Tile)

Tile—Plastic

Johns-Manville B23–26
Kentile, Inc. Ba/2
Robbins Floor Products, Inc. Ba/3
Uvalde Rock Asphalt Company Ba/4

Tile—Rubber

Congoleum Nairn, Inc. B11
Kentile, Inc. Ba/2
Robbins Floor Products, Inc. Ba/3

Tile—Structural (see Structural Tile)

Tile—Wall

Congoleum Nairn, Inc. B11
Johns-Manville B23–26
Kentile, Inc. Ba/2
Metropolitan Brick, Inc. Bc/1
Mosaic Tile Company B20, 21
Natco Corporation B19
United States Quarry Tile Co. B22

Tile Cleaners

Hillyard Chemical Company H10, 11
Huntington Laboratories, Inc. H14

Time Recorders, Stamps & Timekeeping Systems

International Business Machines Corp. Cg/1
Simplex Time Recorder Co. Cg/3

Timers—Electric Sports

All-American Scoreboard Corp. G17
Brown Company, M. D. G16
Fair Play Mfg. Co. G18
International Business Machines Corp. Cg/1
Medart Products, Inc. G6, 7
Naden & Sons Electric Scoreboard Co. G19

Toilet Compartments

Pennsylvania Slate Producers Guild Inc. B41
Sanymetal Products Co., Inc. ... B32, 33

Tool Sets—Student (see Tools—Hand)

Tool Storage Bins & Cabinets

Lyon Metal Products, Inc. F64, 65
Republic Steel, Berger Mfg. Div. F63
Star Steel Equipment Co., Inc. F71
Tolerton Company Fc/1

Tools—Hand

Greenlee Tool Co. F34
Lufkin Rule Co. F35
Millers Falls Company F36
Stanley Tools F37
Starrett Company F38

Tools—Machine

Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Brown & Sharpe Mfg. Co. F39–42
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Duro Metal Products Company F50
Haag Machine Company, Inc. F51
LeBlond Machine Tool Co. F52
Logan Engineering Company F53
Niagara Machine & Tool Works F54
Oliver Machinery Company F55
Shopmaster, Inc. F56
South Bend Lathe Works F57
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

Tools—Portable, Electric

Black & Decker Mfg. Co. F45
Millers Falls Company F36

Tops—Counter, Table, Desk etc.

Alberene Stone Corp. of Virginia ... F18
Fiberesin Plastics Company D56
Formica Company D57
General Electric Company Dc/6
National School Furniture Co. Dc/3
Pennsylvania Slate Producers Guild Inc. B41
Tolerton Company Fc/1
United States Plywood Corp. B45
Van Range Co. E32
Wood-Metal Industries, Inc. Ec/3

Towers—Floodlight, Radio, Maintenance

Safway Steel Products, Inc. G11
Truscon Steel Div., Republic Steel A26, 27

Tracing Cloths

Holliston Mills, Inc. 1074

Tracks for Doors

Richards-Wilcox Mfg. Co. B48, 49
Stanley Works B55

Tractors

Gravely Tractors, Incorporated H30
Worthington Mower Company H31

Transcription Players

Automatic Projection Corp. D16
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DuKane Corporation D14, 15
Presto Recording Corporation D23
Radio Corp. of America D17–22

Transformers

General Electric Company F10–16
Graybar Electric Co., Inc. C54
Westinghouse Electric Corporation . Fa/1
Weston Electrical Instrument Corp. F19–22

Trays—Dish, Food, etc.

Aluminum Cooking Utensil Company E18, 19
Boonton Molding Company E12
Keyes Fibre Sales Corporation E16

Treads—Stair & Floor

Alberene Stone Corp. of Virginia .. A12
American Abrasive Metals Co. . B14, 15
American Mason Safety Tread Co. . B13
Melflex Products Company, Inc. B16
Robbins Floor Products, Inc. Ba/3
Wooster Products, Inc. B17

Trim for Bulletin & Chalkboards Maprails, etc.

Inland Steel Products Company B38
Rowles Co. B42

Trim for Doors, Windows, Corners, etc.

Inland Steel Products Company B38
Truscon Steel Div., Republic Steel A26, 27

Troughs & Trim—Chalkboard (see Chalkboard Troughs & Trim)

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Alberene Stone Corp. of Virginia ... F18
Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. .. F26, 27
Metalab Equipment Corp. F28, 29
Sjostrom Co., Inc., John E. F30
United States Stoneware Co. F31

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Macomber Incorporated A14
Rilco Laminated Products, Inc. . A16, 17

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General Electric Company F10–16
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Corning Glass Works F7

Tubing—Plastic

United States Stoneware Co. F31

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Alberene Stone Corp. of Virginia .. F18
Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. ...F26, 27
United States Stoneware Co. F31

Typewriter Desks & Tables

Desks of America, Inc. D43

Typewriters

International Business Machines Corp. Cg/1
Remington Rand Inc. D76, 77
Underwood Corporation D72, 73

Umbrella Racks

Vogel-Peterson Company Db/1

Unit Heaters & Ventilators

American Air Filter Co. Inc.—Herman Nelson Ca/1
Bush Manufacturing Company C10
Fedders-Quigan Corporation C14
Gannon Co., Inc., Russell R. C15
Jackson & Church Company C17
Nesbitt, Inc. Ca/2; Ca/5
Trane Co. C24, 25

Urinals

Crane Co. C30, 31

Urns—Coffee (see Coffee Urns)

Utensils—Cooking (see Cooking Equipment & Utensils)

Vacuum Cleaners—Wet & Dry

Clarke Sanding Machine Company ... H5
Continental Car-Na-Var Corp. H6
Hild Floor Machine Company H12
Holt Manufacturing Company H13
Kent Company, Inc. H15
Lincoln-Schlueter Floor Machinery Co. H17
Multi-Clean Products, Inc. H18, 19
Spencer Turbine Company H20
United Floor Machine Company, Inc. H21

Vacuum Cleaning System

Spencer Turbine Company H20

Vacuum Heating Pumps (see Pumps—Vacuum Heating)

Valve Reconditioning Equipment

Black & Decker Mfg. Co. F45

Valves—Temperature Regulating

Johnson Service Company C18, 19
Lawler Automatic Controls, Inc. ... C37
Powers Regulator Co. Cc/2
Symmons Engineering Company ... C38

Valves—Thermostatic Shower Mixing

Lawler Automatic Controls, Inc. C37
Powers Regulator Co. Cc/2
Symmons Engineering Company C38

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Empire Varnish Company H7
Hillyard Chemical Company H10, 11

Vaults

Mosler Safe Company D78

Vegetable Peelers (see Peelers—Vegetable)

Venetian Blinds

Levolor Lorentzen, Inc. Af/1
Rowles Co. B42

Ventilating Pipe & Fittings

Knight, Maurice A. Fb/1
Laboratory Furniture Co., Inc. ... F26, 27

Ventilating Units

American Air Filter Co. Inc.—Herman Nelson Ca/1
Gannon Co., Inc., Russell R. C15
Jackson & Church Company C17
Nesbitt, Inc. Ca/2; Ca/5
Powers Regulator Co. Cc/2
Trane Co. C24, 25

Ventilators—Glass Block

Marmet Corporation Ad/7

Ventilators—Roof

Knight, Maurice A. Fb/1
Robertson Company, H. H. Aa/2
Swartwout Company C27

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Robertson Company, H. H. Aa/2
Swartwout Company C27

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Brown & Sharpe Mfg. Co. F39–42
Columbian Vise & Mfg. Co. F33

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Alberene Stone Corp. of Virginia .. A12
Kentile, Inc. Ba/2

Walks, Pavements, Treading, etc. (see Pavements, Walks, etc.)

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Wall System

Moduwall, Inc. Bh/1

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Kimble Glass Co., Owens-Illinois ... A31
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Fairhurst Co., Inc., John T. B30, 31
Glynn-Johnson Corporation Bk/5
Nelson Co., Inc., A. R. B50
Richards-Wilcox Mfg. Co. B48, 49
Sargent & Greenleaf, Inc. B52, 53
Stanley Works B55
Vogel-Peterson Company Db/1
Yale & Towne Mfg. Co. Bk/4

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Borroughs Manufacturing Company .. D26
Nelson Co., Inc., A. R. B50
Richards-Wilcox Mfg. Co. B48, 49
Vogel-Peterson Company Db/1

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All-Steel Equipment Inc. D67
Fairhurst Co., Inc., John T. B30, 31
Interior Steel Equipment Co. .. F70; B47
Kewaunee Manufacturing Co. F23
Lyon Metal Products, Inc. F64, 65
Medart Products, Inc. F66, 67
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Nelson Company, Inc., A. R. B50
New Castle Products, Inc. Bg/3
Penn Metal Corp. of Penna. F68, 69
Republic Steel, Berger Mfg. Div. F63
Richards-Wilcox Mfg. Co. B48, 49
Star Steel Equipment Co., Inc. F71
Wood-Metal Industries, Inc. Ec/3

Washers—Clothes

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Washroom Equipment & Supplies

Bradley Washfountain Co. Cc/1
Crane Co. C30, 31
Electric-Aire Engineering Corp. C36
Hillyard Chemical Company H10, 11
Huntington Laboratories, Inc. H14

Waste Disposers

General Electric Company Ec/1
Morse Boulger Destructor Co. C29

Waste Receptacles

Bennett Manufacturing Co. G28
National Vulcanized Fibre Co. H22
Solar-Sturges Mfg. Div., Pressed Steel Car Co., Inc. G30
United Metal Box Co., Inc. G29

Water Closet Cleaners

Huntington Laboratories, Inc. H14

Water Closets

Crane Co. C30, 31

Water Cooler-Refrigerator Combination

Cordley & Hayes C35

Water Coolers & Fountains

Bradley Washfountain Co. Cc/1
Century Brass Works, Inc. C34
Cordley & Hayes C35
Crane Co. C30, 31
Taylor Co., Halsey W. C33

Water Heaters

Farrar & Trefts, Inc. C13
Nash Engineering Company C26
Orr & Sembower, Inc. Ca/3
Petro C20, 21

Waterproofing

Barrett Div., Allied Chemical & Dye Corp. A15
Brisk Waterproofing Co., Inc. A34
Empire Varnish Company H7
Horn Corporation, A. C. Ah/1
Standard Dry Wall Products Ah/2
Structural Waterproofing Corp. A33
Western Waterproofing Co., Inc. A35

Water Purification

Mathieson Chemical Corporation G26
Wallace & Tiernan G27

Water Sport Devices

American Playground Device Co. G22, 23
General Playground Equipment Inc. . G24
Hussey Mfg. Co. G5
Recreation Equipment Corp. G25

Wattmeters (see Meters)

Waxes—Anti-Slip Ingredients

Legge Company, Inc. H16
Multi-Clean Products, Inc. H18, 19

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Continental Car-Na-Var Corp. H6
Fuller Brush Company H8
Hillyard Chemical Company ... H10, 11
Huntington Laboratories, Inc. H14
Kentile, Inc. Ba/2
Legge Company, Inc. H16
Multi-Clean Products, Inc. H18, 19

Waxing Machines—Electric

Advance Floor Machine Company H3
American Floor Surfacing Machine Co. H4
Clarke Sanding Machine Company ... H5
Continental Car-Na-Var Corp. H6
General Floorcraft, Inc. H9
Hild Floor Machine Company H12
Holt Manufacturing Company H13
Huntington Laboratories, Inc. H14
Kent Company, Inc. H15
Lincoln-Schlueter Floor Machinery Co. H17
Multi-Clean Products, Inc. H18, 19
United Floor Machine Company, Inc.. H21

Weatherproofing

Brisk Waterproofing Co., Inc. A34
Horn Corporation, A. C. Ah/1
Standard Dry Wall Products Ah/2
Structural Waterproofing Corp. A33
Western Waterproofing Co., Inc. A35

Weather Strips

Accurate Metal Weather Strip Co., Inc. A36

Winches

Thompson Electric Company C52

Window Blinds (see Venetian Blinds)

Window Curtains & Draperies (see Curtains & Draperies)

Window Guards—Iron & Wire Mesh

Kinnear Manufacturing Co. B46
Stewart Iron Works Co. H26

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Adams & Westlake Company Ad/1
Bayley Co., William A20, 21
Flynn Mfg. Co., Michael A24, 25
Marmet Corporation Ad/7
Truscon Steel Div., Republic Steel A26, 27

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Window Shade Hardware

Joanna Western Mills Company . A28, 29

Window Shades

Columbus Coated Fabrics Corp. A30
Joanna Western Mills Company . A28, 29
Rowles Co. B42

Window Sills (see Sills—Door & Window)

Window Trim (see Trim for Doors, Windows, Corners, etc.)

Windows—Aluminum (see Aluminum Windows)

Windows—Awning & Projected Type

Adams & Westlake Company Ad/1
Aluminum Window Manufacturers Assn. Ad/2
Bayley Co., William A20, 21
Cupples Products Corporation Ad/8
Flynn Mfg. Co., Michael A24, 25
General Bronze Corporation Ad/4
Marmet Corporation Ad/7
Truscon Steel Div., Republic Steel A26, 27
Tru-Seal Window Division, Industrial Machine Tool Co., Inc. A22
Windalume Corporation A23

Windows—Double Hung

Adams & Westlake Company Ad/1
Aluminum Window Manufacturers Assn. Ad/2
Bayley & Co., William A20, 21
Cupples Products Corporation Ad/8
General Bronze Corporation Ad/4
Marmet Corporation Ad/7
Russell Company, F. C. Ad/5
Truscon Steel Div., Republic Steel A26, 27
Windalume Corporation A23

Windows—Glass Block for

Kimble Glass, Owens-Illinois A31
Marmet Corporation Ad/7
Pittsburgh Corning Corp. A19, 32

Windows—Intermediate Casement

Aluminum Window Manufacturers Assn. Ad/2
Marmet Corporation Ad/7
Truscon Steel Div., Republic Steel A26, 27

Windows—Metal-Framed

Adams & Westlake Company Ad/1
Aluminum Window Manufacturers Assn. Ad/2
Bayley Co., William A20, 21
Cupples Products Corporation Ad/8
Flynn Mfg. Co., Michael A24, 25
General Bronze Corporation Ad/4
Marmet Corporation Ad/7
Russell Company, F. C. Ad/5
Truscon Steel Div., Republic Steel A26, 27
Tru-Seal Window Division, Industrial Machine Tool Co., Inc. A22
Windalume Corporation A23

Windows—Storm (see Storm Windows)

Wire—Barbed

Anchor Post Products, Inc. H27
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H23
Continental Steel Corporation H24
Cyclone Fence Dept., United States Steel Corporation H25
Stewart Iron Works Co. H26

Wire Enclosures

Anchor Post Products, Inc. H27
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. H23
Continental Steel Corporation H24
Cyclone Fence Dept., United States Steel Corporation H25
Stewart Iron Works Co. H26

Wire Fabric—Welded

Laclede Steel Company A13
Truscon Steel Div., Republic Steel A26, 27

Wire Gymnasium Baskets (see Baskets—Wire)

Wires & Wiring Installations

Federal Electric Products Co. F17
Graybar Electric Company C54

Wood Flooring

Jennison-Wright Corporation Ba/1

Woodworking Machinery & Tools

Atlas Press Company F46, 47
Black & Decker Mfg. Co. F45
Columbian Vise & Mfg. Co. F33
Duro Metal Products Company F50
Greenlee Tool Co. F34
Haag Machine Company, Inc. F51
Logan Engineering Company F53
Millers Falls Company F36
Oliver Machinery Company F55
Shopmaster, Inc. F56
Stanley Tools F37
Walker-Turner Div., Kearney & Trecker Corp. F58, 59

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Interior Steel Equipment Co. F70
Kewaunee Manufacturing Co. F23
Laboratory Furniture Co., Inc. ... F26, 27
Lyon Metal Products, Inc. F64, 65
Metalab Equipment Corp. F28, 29
Standard Pressed Steel Co. F60
Tolerton Company Fc/1

DISTRIBUTORS OF EDUCATIONAL EQUIPMENT AND SUPPLIES

Listing in this directory is restricted to the regional distributors of educational furniture, equipment, materials and supplies who maintain at a warehouse or store stocks of the principal lines they represent.



Region 1—New England States

Apothecaries Hall Co.[1], 8 Benedict St., Waterbury 88, Conn.

Bailey Film Service[2], 59 Chandler St., Worcester, Mass.
Audio-Visual Service and Supplies

Milton Bradley Co.[1], 17 Fordham Rd., Boston 34, Mass.
Milton Bradley Art and Education Materials
Milton Bradley Furniture
American Playground Device Equipment
American Desk Mfg. Company—Furniture
Complete School Supply and Equipment Line

Cambosco Scientific Co.[3], 37 Antwerp St., Boston, Mass.

Cascade Paper and School Supplies, Inc., 1 Brown St., North Adams, Mass.

Central Scientific Co.[3], 79 Amherst St., Cambridge 42, Mass.

Joe Cifre, Inc.[2], 44 Winchester St., Boston 16, Mass.

The Ciafin Co.[3], 40 Mathewson St., Providence 3, R. I.

Collins Motion Picture Service, 506 St. Paul St., Baltimore, Md.

Doe & Ingalls, Inc.[3], Vine & Garden Sts., Boston, Mass.

Eastern Film Libraries[2], 148 Grand St., Waterbury, Conn.

Eastern Scientific[3], 51 Bassett St., Providence, R. I.

Equipment Sales Co., Inc., 3013 Dixwell Ave., Hamden, Conn.

Nat Fasnce Audio-Visual Service[2], 210 Waterman Avenue, East Providence, R. I.

Fisher Scientific Co.[3], 635 Greenwich St., N. Y. 14, N. Y.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Flieg & Newbury[2], 41-45 Water St., Torrington, Conn.

Gilbert & Kelley, Inc., 134 Middlesex St., Lowell, Mass.

Gledhill Brothers, Inc.[1], 20 Chestnut Ave., Boston 30, Mass.
American Crayon Co.—Art Materials
Bavinco Mfg. Co.—Homemaking Equipment
Durham Mfg. Co.—Steel Folding Chairs
Heywood-Wakefield Co.—School Furniture—Auditorium Seating
Kewaunee Mfg. Co.—Laboratory Equipment
School Supplies and Furniture
Wallace Pencil Co.—Pencils
Maps—Globes—Charts
Teachers' Desks and Chairs
Playground Equipment

D. K. Hammett, Inc.[2], 620 Congress St., Portland 3, Me.

J. L. Hammett Co.[1], 290 Main St., Cambridge 42, Mass.
American Seating Company, School Furniture
Binney & Smith Company, Crayola and Art Materials
Harbutt's Plasticine
Kindergarten Material & Furniture
Wayne Iron Works, Grandstands
Weber Costello Company, Hyloplate, Sterling and Litesite chalkboards
School Supplies
Blackboards
Paper
Bulletin Boards
Composition and examination books
Hand looms for weaving & occupational therapy material
Diplomas and testimonials
Pencils—Eagle & Dixon
Maps and Globes

H. B. Motion Picture Service[2], 174 George St., New Haven 10, Conn.

Headlight Film Service[2], 111 Ocean St., South Portland, Me.
Bell & Howell Special Representative for Maine
American Optical-Bausch & Lamb—Squibb Taylor
SVE-TDC projection equipment
Radiant Screens—Recorders—filmstrips, etc.
Complete Audio-Visual Service

Howe & French, Inc.[3], 99 Broad St., Boston 10, Mass.
Laboratory equipment and supplies
Microscopes—optical instruments
Pyrex and Kimble glassware
Beckman instruments—Analytical Balances
Reagent Chemicals—J. T. Baker—Merck and Company

Inter Church Audio-Visuals, Inc.[2], 15 May St., Hartford, Conn.

Jarrell-Ash Co.[3], 26 Farwell St., Newtonville 60, Mass.
Spectrographs and accessories
Micro Spectrophotometer
Interferometers
Refroctometers
Microphotometers, Recording and Non Recording
Microscopes
Monochromators

Ladd Visual Service[2], 235 Stuart Street, Boston 8, Mass.

Macalaster Bicknell Co. of Conn.[3], 181 Henry St., New Haven 11, Conn.

Macalaster Bicknell Co.[3], 243 Broadway, Cambridge 39, Mass.

McAuliffe Paper Co., Inc., Burlington, Vt.
School Supplies, Art Materials, Sanitary Equipment
School Furniture
American Playground Device Co.
Horn Brothers Co. (folding bleachers and partitions)
Luther O. Draper Shade Company, window shades

E. F. Mahady Co.[3], 851 Boylston St., Boston 16, Mass.
General Laboratory Supplies
Microscopes
Kimble and Pyrex Glassware
Merck Chemicals
Hamilton Science Class Room Furniture and Equipment

Mainco Trading Co.[1], 57 Pine Street, Canton, Mass.

Massachusetts Motion Picture Service, Inc.[2], 35 Market St., Lynn, Mass.

Minot Films, Inc.[2], 1 Main Street, Milbridge, Me.
1000, 16 mm Sound Feature titles, 3000 Short Subjects
Exclusive New England distributors of United World Films
Projectors, Filmstrip and Slide Projectors
Large Library of Silent features and short subjects
Large Library of Free Loan Subjects, 16 mm Sound

Motion Picture Supply Co., 714 North Cleveland St., Richmond, Va.

Movie Center[2], 7 Pearl St., Springfield 3, Mass.

Movocco Film[2], 14 Leonard St., Springfield 4, Mass.

The Office Appliance Co., 18 Custom House St., Providence, R. I.

Percy Orrell[2], 34 Mendon St., Hopedale, Mass.

The Papercrafters, Inc., 724 Main St., Holyoke, Mass.

Herbert G. Parker Co.[2], Ocean House Road, Cape Elizabeth, Me.
Ampro Projectors
Bogen School Sound Systems
Stage Curtains

G. H. Payne Motion Picture Service[2], United Theatre Bldg., Westerly, R. I.

Peakes Laboratory Supply Co., Inc.[3], 22 Lexington St., Rear, Waltham 54, Mass.

Pix Film Service[2], 34 E. Putnam Ave., Greenwich, Conn.

A. H. (Jack) Rice Co., Inc.[2], 78 W. Central St., Manchester, N. H.

Rice Film Co.[2], 123 Pleasant St., Manchester, N. H.

Rockwell Film & Projection Service[2], 182 High St., Hartford, Conn.

SerCon[2], 22 Green Street, New London, Conn.

Avard J. Sloat[2], 640 Greenville Ave., Providence 11, R. I.

Ray S. Snyder Company, 9 East 45th Street, New York 17, N. Y.
Fred Medart Products, Gymnasium Apparatus, Scoreboards, Telescopic Gym Seats, Basketball Backstops
Mutschler Hardwood Cabinetry for Foods and Clothing, Homemaking Depts.
Sani-Dri Electric Hand-Hair Dryers
Sico Rolling Folding Combination Table and Bench Units
Wood and Steel Bleachers and Grandstands

South End Film Library[2], 56 Vallonia Terrace, Fall River, Mass.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Stanley-Winthrop's, Inc.[2], 90 Washington Street, Quincy 69, Mass.
Ampro-Sound Projectors
Audio-Master-Record Players
Radiant-Screens
United Nation's—Films
Young America—Films & Filmstrips
Films of the Nations—Films

Taylor Films & Equipment Co.[2], 42 Wells Road, Wethersfield, Conn.

United Camera Exchange, 607 Westminster St., Providence 3, R. I.

Valley Cinema, Inc.[2], 958 State St., Springfield 9, Mass.
Audio visual specialists; sales and service
Distributor of RCA Sound Products

Westcott, Slade & Balcolm Co.[2], 95 Empire St., Providence 3, R. I.

Wholesome Film Service, Inc.[2], 20 Melrose St., Boston 16, Mass.

Henry S. Watkins Co.[1], 716 Columbus Avenue, Boston 20, Mass.

Region 2—New York, New Jersey and Ontario, Canada

Ace Scientific & Industrial Co.[3], 810 Broadway, N. Y. 3, N. Y.

Allied Equipment Corp., 10 Chambers St., Trenton, N. J.
Irwin Seating Company—School Desks
Williams & Brower, Inc.—Wood Tables & Chairs
Jasper Desk Company—Office Desks
Jasper Chair Company—Office Chairs
Durham Mfg. Co.—Folding Chairs

Amend Drug & Chemical Co., Inc.[3], 117-119 E. 24th Street, New York 10, N. Y.
Analyzed Reagents—Your Favorite Brands
Eastman Kodak & Matheson Organic Chemicals
Rare Inorganic Chemicals
National Aniline Biological Dyes
Difco Media
Nutritional Biochemicals

American Seating Co.[1], Empire State Division, 923 W. Genesee St., Syracuse 4, N. Y.

American Seating Co.[1, 2], 16th at Hamilton, Philadelphia 30, Pa.
(New Jersey only—see listing Region 3)

Ashley-McCormick Co.[2], 32 E. Commerce St., Bridgeton, N. J.

Association Films, Inc.[2], 347 Madison Ave., N. Y., N. Y.

Audio & Video Products Corp.[2], 730 Fifth Ave., N. Y. 19, N. Y.

Audio Film Center, 10 Fiske Place, Mount Vernon, N. Y.

Bacon & Vincent Co., Inc.[1], 1 Ellicott St., Buffalo 3, N. Y.; 1501 Franklin Ave., Mineola, N. Y.
Audio Visual Aids Department
Beseler opaque and transparency projectors
Cram maps, charts and globes
Curriculum filmstrips
Encyclopedia Britannica filmstrips
Jam Handy instructional filmstrips
Radiant projection screens and shadow boxes
S.V.E. projectors, filmstrips and slides
Furniture & Contract Department
Bavinco home economics equipment
Burke playground and athletic equipment
Draper window shades
Gunlocke classroom seating furniture
Metalab laboratory equipment
Norcor classroom seating
Supplies Department
Chalk and cork boards and supplies
Ditto duplicating machines, paper and supplies
School supplies and papers of all kinds

Bardeen's Inc.[1], 543 E. Genesee St., Syracuse 1, N. Y.
Art and handicraft products
Class registers and school forms
Kindergarten supplies and equipment
Playground and athletic equipment
School supplies and school furniture

E. J. Barnes and Co., Inc.[2], 45 Rockefeller Plaza, N. Y. 20, N. Y.

J. & H. Berge[3], 145 Hudson St., New York 13, N. Y.

Biological Supply Co.[3], 1176 Mt. Hope Ave., Rochester 7, N. Y.

Bovik and Crandall[2], 263 State St., Elmira, N. Y.

Brandon Films, Inc.[2], 200 W. 57th St., New York 19, N. Y.
Largest Selection European Films in U. S.
16mm *Rental* Library—*Feature Films*
(American and Foreign Language Motion Pictures)
16mm Films for *Sale*—*Short Films*
(16mm Films on Art, Music, Dance)

Walter A. Braun Co., 249 High St., Newark 2, N. J.

Buchan Pictures[2], 122 W. Chippewa St., Buffalo, N. Y.

Buffalo Apparatus Corp.[3], 82-90 Chenango St., Buffalo, N. Y.

Business Furniture[1], 542 North Avenue, Elizabeth, N. J.
Griggs Equipment Co.—School furniture—auditorium seating
Virco Mfg. Co.—School furniture—folding chairs
Mahoney Sales Co.—School Furniture
Midwest Folding Products—Folding Tables
Jasper Table Co.—School and office tables

Council Films, Inc.[2], 50 N. Main St., Homer, N. Y.

Crawford & Immig, Inc.[2], 265 W. 14th St., N. Y., N. Y.

Herbert L. Farkas Co.[1], 892 Broad Street, Newark 2, N. J.
Furniture & Equipment for Complete School Installations
W. H. Gunlocke Chair Co.—School & Office Furniture
Irwin Seating Co.—School and Auditorium Seating
Maple Wood Prod. Co.—School Furniture
Hoosier Desk Co.—Office Desks and Tables
All Steel Equipment Co.—Steel Desks, Files, Cabinets & Lockers
Berger Mfg. Co.—Steel Shelving, Lockers

The Filmstrip House[2], 15 West 46th St., New York 36, N. Y.

Earl A. Fisher, 71 Thompkins Ave., Mamaroneck, N. Y.

Fleetwood Films, Inc., 10 Fiske Place, Mt. Vernon, N. Y.

General Films, Ltd.[3], 156 King St., W., Toronto, Ontario, Canada

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

General Laboratory Supply Co.[3], Box 2607, Paterson, N. J.
Pyrex and Kimble Glass, Coors Porcelain
Instruments, Glass Blowing, Chemicals

Charles J. Giegerich[2], 42-20 Kissena Blvd., Flushing, L. I. 55, N. Y.

Emil Greiner Co.[3], 20-26 N. Moore St., N. Y. 13, N. Y.

Otto R. Greiner Co.[3], 221 High St., Newark 2, N. J.

Hallenbeck & Riley[2], 562 Broadway, Albany 7, N. Y.

J. L. Hammett Co.[1], Union, N. J.
School Papers, Examination Books
Art & Crafts material, Kindergarten supplies
Looms, Weaving supplies
Bulletin Boards, Blackboards, etc.
Harbutt's Plasticine

Bernard J. Hicks, Inc., 1629 Burnett St., Brooklyn 29, N. Y.

Institutional Cinema Service, Inc.[2], 1560 Broadway, N. Y. 36, N. Y.
Rental of 16mm entertainment films
Visual aids service, specializing in educational films
Film equipment, accessories, sound systems

L. Kaltman & Sons, Inc.[2], 287 Washington St., Newark 2, N. J.

Ken Killian Company[2], 17 New York Ave., Westbury, N. Y.
RCA Visual Products Distributor
Motion Picture, Opaque, Filmstrip & Slide projection equipment materials and supplies
Magnetic and disc recording-playback equipment
Screens, Stands, Storage, Training Aids, Intercom Systems

King Cole Projection Service, Inc.[2], 340 Third Ave. at 25th St., N. Y. 10, N. Y.

Kingsway Film Equipment, Ltd.[2], 3569 Dundas St., W., Toronto 9, Ontario, Canada

Long Island Surgical Supply Co.[3], 87-82 Merrick Blvd., Jamaica 3, L. I., N. Y.

W. B. Lundman Visual Aids Service[2], 1520 74th St., Brooklyn 28, N. Y.

E. Machlett and Son[3], 220 East 23rd St., New York 10, N. Y.

Marks & Fuller, Inc., 332 E. Main St., Rochester 4, N. Y.

Meyer Scientific Supply Co., Inc.[3], 211 North 8th St., Brooklyn, N. Y.

Movies U. S. A., Inc.[2], 729 Seventh Ave., New York 19, N. Y.
Distributors of free, educational films

Meyer School Supplies Limited[1], 106-108 York St., Toronto; Moncton, Montreal, Winnipeg, Saskatoon, Edmonton.

N. J. Laboratory Supply Co.[3], Div. of Central Scientific Co., 441 Clinton Ave., Newark 8, N. J.

N. Y. Laboratory Supply Co., Inc.[3], 76-78 Varick St., N. Y. 13, N. Y.

N. Y. Scientific Supply Co.[3], 28 W. 30th St., N. Y. 1, N. Y.

Nu-Art Films, Inc.[2], 112 W. 48th St., N. Y. 36, N. Y.
16mm sound and silent Educational-Entertainment
Religious film Rentals and Sales
8mm Films for Sale
Projectors, Recorders, and other Visual and Audio Equipment
Film Strips and Slides

Palo Laboratory Supplies Inc.[3], 81 Reade St., N. Y. 7, N. Y.

Para Laboratory Supply Co.[3], 221 N. Hermitage Ave., Trenton 8, N. J.
Glassware All Types—including Special Fabrication
Analytical Balances—Instrument Repairs
Chemicals: Reagent—Fine Organic—Biochemicals
Microscopes & Photoelectric Instruments
General Laboratory Supplies

Peckham, Little & Co., 243 W. 17th St., N. Y., N. Y.

J. C. Reiss Co.[3], 10 Hill St., Newark 2, N. J.

Renner Motion Picture Service[2], 539 Genesee St., Buffalo 4, N. Y.
Complete Audio-Visual Sales & Service

Riverside Chemical Co., Inc.[3], 871-947 River Rd., N. Tonawanda, N. Y.
Industrial and Laboratory Chemicals
Janitorial and Maintenance Supplies

Robert Brothers, Inc.[1], Collingswood, N. J.

Scientific Glass Apparatus Co., Inc., 100 Lakewood Terrace, Bloomfield, N. J.
General Laboratory Supplies
Laboratory Instruments and Equipment
Laboratory Furniture
Chemicals—All Types
"Pyrex" and Kimble Glassware
Glassblowing Facilities

Skibo Productions, Inc.[2], 165 W. 46th St., N. Y. 36, N. Y.

Ray S. Snyder Co., 9 E. 45th St., N. Y. 17, N. Y.
Fred Medart Products, Gymnasium Apparatus, Scoreboards, Telescopic Gym Seats, Basketball Backstops
Mutschler Hardwood Cabinetry for Foods and Clothing Homemaking Depts.
Sani-Dri Electric Hand-Hair Dryers
Sico Rolling Folding Combination Table and Bench Units
Wood and Steel Bleachers and Grandstands

Sonocraft Corporation, 115 W. 45th St., N. Y. 36, N. Y.
Recording and Sound Equipment
Tape, Disc Recorders
Phonographs and PA Systems

Standard Scientific Supply Corp.[3], 34-38 W. 4th St., N. Y., N. Y.

Sullivan Sound Service[2], 29 Salem Way, Yonkers, N. Y.

Otto Ulbrich Co., Inc., 386 Main St., Buffalo, N. Y.

United Projector & Film Corp., 228 Franklin St., Buffalo 2, N. Y.

United Specialists, Inc.[2], Quaker Hill, Pawling, N. Y.

Webster Paper & Supply Co., Inc.[1], Central Warehouse Bldg., Albany 4, N. Y.
American Crayon Co., "Old Faithful" art items
Binney & Smith Co., "Gold Metal" art materials
Complete line of school and art materials
Playground items

Wilber Visual Service[2], 28 Genesee St., New Berlin, N. Y.
Eastern Office: 119 State St., Albany 7, N. Y.
Representing Bell & Howell and Coronet Films
Complete Audio-Visual Sales and Service

Will Corp.[3], 39 Russell St., Rochester 3, N. Y.

Art Zeiller Visual Education Service[2], 26 Hudson St., Ridgewood, N. J.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Region 3—Pennsylvania, Delaware, Maryland, West Virginia

Ace Audio-Visual Supply[2], 1319 Derry St., Harrisburg, Pa.

American Seating Co. of Pa.[1], 16th St. at Hamilton, Philadelphia 30, Pa.
All types of Public Seating
School supplies and equipment
Complete Furniture and Furnishing for Dormitories and Lounges
Library Furniture
Peterson Laboratory Equipment
Playground and Gymnasium Equipment
Mutschler's Homemaking Equipment
Rol-Fol Tables, Inc.
Universal Bleachers and Grandstands
Chalkboards and Window Shades
Indiana Teachers and Office Desks

Milton Bradley Co.[1], 3304 Arch St., Philadelphia 4, Pa.
Milton Bradley Art and Educational Materials
Milton Bradley Furniture
Complete School Supply and Equipment Line
American Playground Device Equipment

Burrell Technical Supply Co.[3], 1936-5th Ave., Pittsburgh 19, Pa.

Collins Motion Picture Service[2], 502½-506 St. Paul Place, Baltimore 2, Md.

Crichton Engineering Co.[1], 204 Payne Bldg., Charleston 27, W. Va.

District Equipment Company, Inc.[1], 5122 Baltimore Avenue, Hyattsville, Maryland

Edward P. Dolbey & Co.[3], 3613 Woodland Ave., Philadelphia, Pa.

C. M. Eichenlaub Co.[1], 914 Architects Bldg., Philadelphia, Pa. And: 1217 Empire Bldg., Pittsburgh 22, Pa.
Peabody Classroom and Auditorium Seating
Sjostrom "Uniflex" Laboratory Furniture
Wayne Gymstands and Grandstands
Sjostrom "New Life" Library Furniture
Brewer-Titchener "Hostess" Steel Folding Chairs and Tables
Allen Student Desks and Chairs
J. E. Porter Gymnasium Equipment
Manitowoc Church and Chapel Furniture

Fisher Scientific Co.[3], Pittsburgh, New York, Washington, St. Louis, Chicago, Montreal, Toronto
America's Largest Manufacturer–Distributor of laboratory instruments, apparatus, furniture and reagent chemicals

Folkemer Photo Service[2], 927 Poplar Grove St., Baltimore 16, Md.

J. E. Foss Co.[2], 2422 Saw Mill Run Blvd., Pittsburgh 34, Pa.
Special Representative Bell and Howell Co.
Audio Visual Supplies, Service and Equipment

Garrett-Buchanan Co.[1], 12 South 6th St., Philadelphia, Pa.

The Henry B. Gilpin Co.[3], 302 W. Lombard St., Baltimore, Md.

Grise Film Library[2], 105 E. 9th St., Erie 1, Pa.

Haley Audio-Visual Service[2], P. O. Box 703, Charleston 23, W. Va.

Harshaw Scientific, Div. of Harshaw Chemical Co.[3], Jackson & Swanson Sts., Philadelphia 48, Pa.
Laboratory Instruments, Apparatus and Chemicals

Hartman-Leddon Co.[3], 5821 Market St., Philadelphia 39, Pa.

L. B. Herr & Son[1], 46-48 W. King St., Lancaster, Pa.
General Supplies, Arts and Crafts
Brunswick School Furniture

Heyl Physicians Supply Co.[3], 22 West 9th St., Erie, Pa.

William G. Hintz, Inc.[1], 838 Penn St., Reading, Pa.
Complete School and Art Supplies
School Furniture
Samson Metal Folding Chairs and Tables
Steel Lockers and Filing Supplies
Ditto Machines and Supplies

Hollywood Film Service[2], 841 Penn St., Reading, Pa.
Ampro, Kodascope, & Other Sound Projectors
Ampro, Revere, and Webcor Tape Recorders
American Optical Projection Equipment
Audio-Visual and Photographic Supplies
16mm Rental Library–Educational and Religious

The James & Law Co., 217 W. Main St., Clarksburg, W. Va.

William G. Johnston Co.[1], 1130 Ridge Ave., Pittsburgh 12, Pa.
American Desk Mfg. Company
Art and Handicraft materials
Berger Steel Furniture and lockers
Everwear playground equipment
General school supplies
Kindergarten supplies and furniture
Laboratory and homemaking equipment

Estate of Harry A. Keene[1], Pottstown, Pa.
General School Supplies
General Art Supplies

Kemmerr Paper Co.[1], 355 Hamilton St., Allentown, Pa.

Kruger Motion Picture Service[2], 3145 N. Broad St., Philadelphia 32, Pa.

Kuntz Motion Picture Service[2], 1319 Vine St., Philadelphia 7, Pa.

Kurtz Bros.[1, 2], Clearfield, Pa.
Branch: 8033 Bennett St., Pittsburgh 21, Pa.
Ditto Machines, Suppliers, Papers
School Supply and Equipment lines, complete
Audio-visual equipment supplies
Kindergarten and playground apparatus
Class, plan books and school annual publishers

Kyle & Co.[1, 2], Court St. & Washington Ave., Clarksburgh, W. Va.
All types school seating
Stage equipment
Laboratory equipment
Audio-Visual aids

J. S. Latta, Inc.[1], 1458 Fourth Ave., Huntington 1, W. Va.

James Lett Co.[3], 225 N. 2nd St., Harrisburg, Pa.

Lewy Studios[3], 853 N. Eutaw St., Baltimore 1, Md.

J. P. Lilley & Son[3], 928 N. Third St., Harrisburg, Pa.
Distributor–Victor Sound Projectors
Audio-Visual Supplies & Equipment

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Lippincott Pictures, Inc., 4729 Ludlow St., Philadelphia 39, Pa.

Metal Fixture Company, Dartmore and Englert Sts., Pittsburgh 10, Pa.
Clarin Manufacturing Co.—Folding Chairs
Dudley Lock Corporation—Combination Padlocks
Vogel Peterson Company—Hat & Coat Racks—Checkroom Equipment
Charles W. Rice Co.—Window Shades & Draperies
Mitchell Manufacturing Co.—Folding Tables; Band-Choral Stands

John P. Morgan Co., Inc., 317 North 13th St., Philadelphia, Pa.
Irwin Seating Company School Furniture
Playtime Stage Risers and Bleachers
Stage Sets and Draperies
Bavinco Home Economics Equipment
Maple Wood Desk and Chair Units

Pavis, Inc., P. O. Box 6095, Charleston, W. Va.

Photographit, Inc.[2], 12 Gallatin Ave., Uniontown, Pa.

Powell Photo Shop[2], 180 S. Main St., Chambersburg, Pa.

B. Preiser Co., Inc.[3], 416 W. Washington St., Charleston, W. Va.

Raymond Rosen Engineering Products[2], 32nd & Walnut, Philadelphia 4, Pa.

The Scientific Equipment Co.[3], 3527 Lancaster Ave., Philadelphia 4, Pa.

Scientific Glass Apparatus Co., Inc.[3], 100 Lakewood Terrace, Bloomfield, N. J.

Elmer A. Simpson[2], 818 Virginia St., West, Charleston 2, West Virginia

Stark Films[2], 537 N. Howard St., Baltimore 1, Md.

Syndicated Films[2], 1022 Forbes St., Pittsburgh 19, Pa.

Arthur H. Thomas Co.[3], W. Washington Square, P. O. Box 779, Philadelphia 5, Pa.
Apparatus and Reagents for laboratories of Chemistry and Biology—1472 pg. catalogue
21,000 items in stock for immediate shipment

Harry A. Trumpfheller, Factory Representative, 1411 East Cliveden St., Philadelphia 19, Pa.
Arlington Seating Co.—Student's desks and chairs
Northern Maple—Student's wood desks and chairs
Durham Mfg. Co.—folding chairs
Formica Top tables
Folding tables

United Lutheran Publishing House[2], 1228 Spruce St., Philadelphia 7, Pa.

J. T. Vernay & Sons Co.[1], 5 East Lexington St., Baltimore, Md.

R. A. Wagner Co., Quakertown, Pa.
Philadelphia office: 1011 Chestnut St.
Griggs Equipment Co.—School Furniture and Auditorium Seating
Clarin Folding Chairs
Valverde School Furniture and Library Equipment
Imperial Wood Desks
Columbia Steel Desks and Filing Equipment
Metwood Folding Tables
Cramer Aluminum Office Chairs
Indiana Chair Co.—Wood Chairs

Welsh Studios[2], 1209-11 E. Chelton Ave., Philadelphia 38, Pa.

West Virginia Seating Co.[1], Huntington 9, W. Va.

Will Corporation of Maryland[3], Baltimore 1, Md.

Williams, Browne & Earle, Inc.[2], 904-06 Chestnut St., Philadelphia, Pa.

Clem Williams Films[2], 623 Wylie Avenue, Pittsburgh 19, Pa.

Wilmington Camera Shop, Inc.[2], 402 Delaware Ave., Wilmington, Del.

Region 4—Ohio, Illinois, Indiana, Kentucky, Michigan (lower peninsula)

Academy Film Service, Inc., 2142 Payne Ave., Cleveland 14, O.
Ampro, RCA, Revere—8mm and 16mm Projectors
Tape Recorders—Film Rental—Beseler Products

Ace Chemical Co.[3], 216 Elm St., Cincinnati 2, Ohio

Acme School Supply[1], 2nd and Race Sts., Cincinnati, Ohio

Advision Associates, Inc.[3], 797 N. Main St., Akron 10, Ohio

Allen Camera Shop[3], 935 Wheeling Ave., Cambridge, Ohio

Allied, Inc.[1], 325 N. Illinois St., Indianapolis 7, Ind.

Allied Scientific Co., 555 South First St., Louisville 2, Ky.

Alpha Cine Service, Inc.[3], 125 E. 6th St., Cincinnati 2, Ohio

American Film Registry[2], 24 E. 8th St., Chicago 5, Ill.

Olson Anderson Co.[2], 1113 McKinley Ave., Battle Creek, Mich.

Association Films[2], 206 S. Michigan Ave., Chicago 8, Ill.

Audio Film Center, 2209 E. 75th St., Chicago 49, Ill.

The Backus Brothers Co., 225 E. Third St., Cincinnati, Ohio
Furniture Contractors & Consultants
Institutional Furniture Made to Order
Formica Furniture & Fixtures
Heywood-Wakefield School Furniture
Lounge, Library & Classroom Specialists
Dormitory Furniture & Bedding
Samsonite & Other Folding Tables—Chairs

Everett M. Bailey[1], 306 Indiana Ave., Pontiac, Ill.

Bartha Visual Education Service[2], 1946 N. High St., Columbus, Ohio

Beckley-Cardy Co.[1], 1632 Indiana Ave., Chicago 16, Ill.

A. M. Blood Co.[1], 326-20th St., Rock Island, Ill.

I. A. Beck School Service Co.[1], 628 Park Ave., Sycamore, Ill.

Milton Bradley Co.[1], 811 So. Wabash Ave., Chicago 5, Ill.
Milton Bradley Art and Educational Materials
Milton Bradley Furniture
American Playground Device Equipment
American Desk Mfg. Company—Furniture
Complete School Supply and Equipment Line

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Brady & Earnhart[1], 215 W. 3rd St., Marion, Ind.

Brant Visual Aids[2], 1202 Wabash Ave., Terre Haute, Ind.

Brice RCA Sales[2], 4417 N. Saginaw St., Flint 5, Mich.

The Charles H. Bunch Co.[1, 2], Southern Trust Bldg., Louisville 2, Ky.

Burke's Motion Picture Co.[2], 434 Lincoln Way West, South Bend 1, Ind.

Capital Film Service[2], 224 Abbott Road, East Lansing, Michigan

Carpenter School Equipment Co.[1], Mitchell, Ind.

Carpenter Visual Service, Inc.[2], 13902 Euclid Ave., Cleveland 12, Ohio

Central School Supply Co., Inc.[1], 311 W. Main St., Louisville, Ky.

Central Scientic Co.[3], 1700 Irving Park Rd., Chicago 13, Ill.

Chemical Rubber Co.[3], 2310 Superior Ave., Cleveland, Ohio

Chicago Apparatus Co.[3], 1735 N. Ashland Ave., Chicago, Ill.

Chicago Seating Co.[1], 666 N. Lake Shore Drive, Chicago 11, Ill.

Church School Pictures, Inc.[2], 1118 Walnut Ave., Cleveland 14, Ohio

Clark Chemical & Supply Co., Inc.[3], 1527 Miller St., Indianapolis 7, Ind.

Jack C. Coffey Co.[3], 205 W. Wacker Drive, Chicago 6, Ill.

Cousino Visual Education Service[2], 2325 Madison Ave., Toledo 2, Ohio

Covington Camera Shop[2], 808 Madison Ave., Covington, Ky.

Crowley Thompson Chemical Co.[3], Lederer Terminal, Foot of E. 9th St., Cleveland 14, Ohio

D. T. Davis Co.[2], 178 Walnut St., Lexington 34, Ky.

Dennis Film Bureau[2], 29 E. Maple Street, Box 374, Wabash, Ind.
Almanac Educational Films, Kiernan Kaleidoscopes
Cathedral, Family, and Concordia religious films
Entertainment Features and Short Subjects

DeWald Audio Visual Equipment, Inc., 4806 S. Logan St., Lansing 10, Mich.

Dill Camera Shop[2], 119 S. Main St., Mishawaka, Ind.

The Dobson-Evans Co.[1], 1100 W. Third Ave., Columbus 8, Ohio
American Seating Co.—school, auditorium and church furniture
Art supplies, papers and equipment
Athletic supplies and equipment
Blackboards, erasers, chalk and supplies
Ditto and duplicating machines, supplies and papers
Everwear playground equipment
Library, classroom, vocational and office furniture
Maintenance and sanitation equipment and supplies
Pencils, pens, erasers and office supplies
School class registers, records and plan books and forms
School notebooks, tablets, notebook fillers and ream papers
Leavitt bleachers and stadiums
Visual and audio equipment and teaching aids

Eberbach & Son Co.[3], 200 E. Liberty St., Ann Arbor, Mich.

Educational Aids Service[2], 3034 Thayer St., Evanston, Ill.
Audio Visual Aids

Eldridge Motion Pictures[2], 4139 W. High Street, Columbus 14, Ohio

Engleman Visual Education Service[2], 4754 Woodward Ave., Detroit 1, Michigan

Escar Motion Picture Service, Inc.[2], 7315 Carnegie Ave., Cleveland 3, Ohio

B. F. Farnell Co.[1], 435 W. 7 Mile Rd., Detroit 3, Mich.
Arlington and American Desk School Furniture
Hamilton Laboratory Furniture
Sjostrom Library Furniture
Bavinco Homemaking Furniture
Rowles Shades and Chalkboards
Fred Medart Gym Equipment
Sico Tables
Adjustable Cabinets
Hamilton Bookstacks

Film Associates, 440 E. Schantz Ave., Dayton, Ohio

Films Unlimited[2], Farmers Bank Bldg., Mansfield, Ohio

A. Flanagan Co., 730 N. Franklin, Chicago, Ill.

Fletchers Visual Supplies[2], 218 W. Main St., Urbana, Ill.

The Foto Craft Shop, Inc.[2], 213 High St., Hamilton, Ohio

Fried's Audio Visual Center[2], 103 West Front St., Bloomington, Ill.

Fryan Film Service[2], 1810 E. 12 St., Cleveland 14, Ohio

Garden City Education Co.[1], 27 S. Wabash Ave., Chicago 4, Ill.

Gary Camera Co.[2], 619 Washington, Gary, Ind.

W. D. Gatchel & Sons[2], 431 West Walnut St., Louisville 2, Ky.

General Biological Supply House, Inc.[3], 761 E. 69th Pl., Chicago 37, Ill.

Gillespie Visual Education Service[2], 220 State St., St. Joseph, Mich.

The D. H. Goble Printing Co.[1], 15 S. East St., Greenfield, Ind.
Indiana Distributors for Rice Hold-Fast Shades
Norcor School Furniture

Gospel Trumpet Co.[2], East 5th at Chestnut, Anderson, Ind.

John R. Green Paper Co.[1, 2], 233 Scott St., Covington, Ky.

Greenwood's Camera Shop[2], 148 N. Vermillion St., Danville, Ill.

Hadden Films, Inc.[2], 422 W. Liberty St., Louisville 2, Ky.

Ralph V. Haile & Associates[2], 215 Walnut St., Cincinnati 2, Ohio

Harshaw Scientific[3], Div. of Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio
Laboratory Instruments, Apparatus, and Chemicals

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Harshaw Scientific[3], Div. of Harshaw Chemical Co., 6265 Wiehe Rd., Cincinnati 13, Ohio
Laboratory Instruments, Apparatus, and Chemicals

Harshaw Scientific[3], Div. of Harshaw Chemical Co., 9240 Hubbell Avenue, Detroit 28, Michigan
Laboratory Instruments, Apparatus, and Chemicals

Heric's Photo Shop[2], 1239 Main St., Essexville, Mich.

J. R. Holcomb & Co.[1], 1710 E. 22nd St., Cleveland 14, Ohio

Howard & Smith, Inc., 22524 Woodward Blvd., Detroit, Mich.
Stocking Distributors of School Shop Machines
Hand Tools, Benches, Equipment & Supplies
General, Farm, Wood, Machine Shop Items
Full Catalog mailed on request
New Shop Planning Service Available

Ideal Pictures Corp.[2], 58 E. South Water St., Chicago 1, Ill.

Illini Audio-Visual Education Service[2], 1314 Main St., Peoria, Ill.

Illinois School Supply Co., 114-140 S. 7th St., Quincy, Ill.

Indiana Visual Aids Co., Inc.[2], 726 N. Illinois St., Indianapolis 6, Ind.

Jensen, Inc.[2], Hotel Durant Bldg., Flint 1, Mich.

Judy Audio-Visual Service[2], P. O. Box 706, Mount Vernon, Ohio

Kauffman-Lattimer Co.[3], 230 N. Front Street, Columbus 16, Ohio
Laboratory supplies and equipment
Reagent Chemicals

Kay Surgical, Inc.[3], 242 Jefferson, Lexington, Ky.

Kentucky School Equipment Co.[1, 2], 119 S. Fourth Ave., Louisville 2, Ky.

Frank W. Kerr Co.[3], 951 Porter St., Detroit, Mich.

Kiger & Co., Inc.[1], 52 W. New York St., Indianapolis 4, Ind.
American Seating Furniture
Draper Window Shades
Hamilton Laboratory Furniture
Mitchell Fold-O-Leg Tables
Weber-Costello Chalkboards, Globes, Maps
Complete Line School Supplies & Equipment

Kilday Visual Education Service[2], 2434 W. Lunt Ave., Chicago 45, Ill.

Theodore Kundtz Co.[1], 1275 Main Street, Cleveland 13, Ohio

Lake-Land Educational Sales[2], 401 S. First St., Pierceton Ind.
Victor Animatograph Corp.
Audio-Visual Aids & Supplies

Arthur S. LaPine & Co.[3], 6001 South Knox Ave., Chicago 29, Ill.
Laboratory equipment & supplies—900 page catalog
Microscopes
Reagent Chemicals
Kimble & Pyrex glassware
Laboratory furniture

Leonard Supply Co., Silver Lake, Ind.

Alden D. Lepley Studios[2], 6369 N. LeMai Ave., Chicago 30, Ill.

Levy's Film & Projection Service, 1648 Pullan Ave., Cincinnati 23, Ohio

Link Equipment Co., 1935 Euclid Avenue, Cleveland 15, Ohio
Arlington & Norcor School Seating
Colonial Eng. Co., Steel Sink and Counter Units
Dudley Locks
Mitchell Fold-O-Leg Tables, Band & Choral Stands
Sico Rolling, Folding Combination Table and Bench Units
Steel-Age Office Furniture
United States Plywood, Armorply Chalkboards

M. E. Lockard Co., 643 N. Howard St., Akron 10, Ohio

Lundgren's Camera Shop[2], 421-7th St., Rockford, Ill.

Madison Printing Service, 87 Safford St., Madison, Ohio

Manse Film Library[2], 2514 Clifton Ave., Cincinnati 19, Ohio

Mapes Brothers, Ogden, Ill.

M. H. Martin Co.[2], 1118 Lincoln Way, E. Massillon, Ohio
Bell & Howell Special Representatives
DuKane and Stromberg Carlson sound systems
Coronet Films, sale and rental
Beseler and American Optical opaque projectors
Screens, tape recorders, filmstrip projectors
Repair station for projectors and sound equipment

McFadden Corp.[1], 3011 E. Saginaw St., Lansing, Mich.
All-Steel Equipment Company files, cabinets and lockers
Bavinco homemaking equipment
Indiana Chair Company school and office desks
In-the-Wall folding tables and benches
Jasper Table Company school and office tables
Mitchell Fold-o-Leg tables, band and choral stands
Norcor school seating
Peabody school and auditorium seating
Recreation playground equipment
Rice, Chas. W., window shades and draperies
Samson folding chairs and tables
Wayne school bus bodies
Wayne steel grandstands and gymstands

The McManus-Troup Co., 713-715 Jefferson Ave., Toledo, Ohio
Folding Chairs & Tables
Filing Cabinets & Supplies
Wood & Steel Office Furniture
Tablet Arm & Student Chairs

Michigan Products, Inc.[1], 1236 Turner St., Lansing, Mich.

Michigan School Service, Inc.[1], Main Box 509, Lansing, Mich.

Middletown Film Libraries[2], 2432 Wilbraham Rd., Middletown 19, Ohio

Midwest Visual Equipment Co.[2], 3518 West Devon Avenue, Chicago, Ill.

Miller Office Supply Co.[1], Box 111, Piqua, Ohio
All-Steel Lockers
Norcor seating furniture
Walrus laboratory equipment
Rice Window Shades & Draperies
International auditorium seating
Howell Playground Equipment
Cram Maps & Globes
Durham folding chairs

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Miller School & Office Supply Co.[1], 475 Fayette St., Hammond, Ind.
Peabody School & Auditorium Seating
Draper Shades & Blackout Curtains
Knoxville Scenic Stage Curtains & Cyclorama
Gestetner Printing Machines
School Supplies and Equipment

Murray Motion Picture Service Co., 879 Reibold Bldg., Dayton 2, Ohio

National Film Service[2], 422 W. Breckinridge St., Louisville 3, Ky.

Newman Visual Education Co.[2], 783 W. Main St., Kalamazoo, Mich.
A complete line of Audio Visual Equipment

Northshore Audio-Visual Sales[2], 2421 Prospect Ave., Evanston, Ill.

Oglesby Equipment Co.[1], 20356 Grand River Ave., Detroit 19, Mich.
Branch: 2163 N. Meridian St., Indianapolis, Ind.
Heywood-Wakefield School and Auditorium Seating
E. H. Sheldon Co., Laboratory, Art and Homemaking Equipment
Clarin Folding Chairs
Oneida School Bus Bodies
Mitchell Fold-A-Leg Tables, Band and Choral Stands
Gotham Snap-Type Aluminum Trim
Playground and Gymnasium Equipment
Custom Office Equipment and Furnishings
Wayne Rolling Gymstands and Bleachers
Interior Steel Lockers, Cabinets and Shelving
Spongex Safety Cushion Wainscott
Educator's School Furniture and Cabinets

Orr, Brown & Price Co.[3], Spring & Front Sts., Columbus, Ohio

Otterbein Press[2], Audio Visual Dept., 252 West 5th Street, Dayton 2, Ohio

B. W. Payne Film Service[2], 1004 Superior Ave., Cleveland 14, Ohio

Pfile's Camera Shop[2], 403 E. Washington St., Springfield, Ill.

The J. E. Porter Corp.[2], 664 N. Michigan Ave., Chicago 11, Ill.
Complete outfitters for the School and Institution

Projection Equipment Co.[3], Union City, Ind.

Nate Quillen Visual Service, 281 Cardinal Dr., R1 Medina, Ohio

Randolph School Supply Co.[1], 708 South St., Champaign, Ill.

Rascher & Betzold, Inc.[3], 730 N. Franklin St., Chicago, Ill.

W. H. Rodebeck Co.[3], 15 E. Maryland St., Indianapolis 4, Ind.

Rupp & Bowman Co.[3], 315 Superior St., Toledo 3, Ohio

E. H. Sargent & Co.[3], 4647 W. Foster Ave., Chicago 30, Ill.
Manufacturer and distributor of scientific laboratory instruments, apparatus and chemical reagents
Complete service for educational scientific laboratories

E. H. Sargent & Co.[3], 1959 E. Jefferson St., Detroit 7, Mich.
Laboratory Instruments, Apparatus and Chemicals

E. H. Sargent & Co.[3], Michigan Div., 1959 E. Jefferson, Detroit 7, Mich.

Schaar & Co.[3], 754 W. Lexington St., Chicago 7, Ill.

Scripture Press[2], 434 S. Wabash Ave., Chicago 5, Ill.

Selected Films, Inc.[2], 410 Green Bay Rd., Kenilworth, Ill.

Shick Supply & Equipment Co.[1], 724 McReynolds Ave., Danville, Ill.

Smith Audio Visual Service[2], 128 W. Washington, South Bend 8, Ind.

Norris Smitley Motion Picture Service[2], Stellhorn Rd., Route 9, Ft. Wayne, Ind.

Springfield Visual Aids[2], 1800 First St., Springfield, Ill.

Standard School Co.[1], 107 W. Washington St., St. Louis, Mich.
Janitor Supplies
Maps and Globes
School Seating
Playground Equipment
Office Equipment
School Supplies and Furniture

Standard Science Supply Co.[3], 1232-39 N. Paulina St., Chicago 22, Ill.

O. J. Steffy & Son, Carlisle, Ind.

Steinhardt & Hanson, Inc., Madison, Ind.

Stinson Projector Sales[2], Box 7, Oak Park, Ill.

Sunny Schick's, 407 W. Washington Blvd., Ft. Wayne, Ind.

Sunray Films, Inc.[2], 2108 Payne Ave., Cleveland 14, Ohio

Todd Visual Service[2], 16019 Hamilton Ave., Detroit 3, Mich.

Tri-State School Supply Co., 810 Main St., Evansville 8, Ind.

Twyman Films, Inc.[2], 400 W. First St., Dayton 1, Ohio
Complete Audio-Visual Projection equipment sales and service for RCA-Eastman-DaLite-Radiant-SVE-Beseler-DuKane and other principal suppliers
SVE—Popular Science Filmstrips. A large library of 16mm sound motion pictures available for rental

United Lutheran Publishing House[2], 860 North Wabash Ave., Chicago 11, Ill.

Vydra Visual[2], 4518 W. Lawrence Ave., Chicago 45, Ill.

Harry M. Ward Co.[1], 222 N. Walnut St., Bryan, Ohio

Wartburg Press[2], Visual Aids Dept., 57 E. Main St., Columbus 15, Ohio

Watland Brothers[2], 13039 S. Western Ave., Blue Island, Ill.

W. M. Welch Mfg. Co.[3], 1515 Sedgwick St., Chicago 10, Ill.

Wilkens-Anderson Co.[3], 4525 W. Division St., Chicago 51, Ill.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Region 5—Virginia, North Carolina, South Carolina, Washington, D. C.

A. S. Aloe Co.[3], 1501-14th St., Northwest, Washington, D. C.
Laboratory Instruments, Apparatus and Chemicals

Asheville Showcase & Fixture Co., 57 Broadway, Asheville, N. C.
Suppliers of Lunchroom Equipment & Supplies

Beaman's Inc.[1], 1060 Battleground Ave., Greenboro, N. C.

Below Sound & Visual[2], P. O. Box 653, Bristol, Va.

Bennett Bros., Ltd.[3], P. O. Box 6218, Charlotte, N. C.

Paul L. Brand & Son[2], 2153 K St., N. W., Washington 7, D. C.

R. L. Bryan Co.[2], Audio-Visual Dept., 1440 Main St., Drawer 900, Columbia, S. C.
Complete Audio-Visual Service
School Supplies

Cardinal Products, Inc.[3], P. O. Box 1611, Durham, North Carolina
Pyrex and Kimble Glassware
Microscopes and Photoelectric Instruments
Merck and Mallinckrodt Reagent Chemicals
Matheson-Coleman and Bell Organic Chemicals
Analytical Balances
General Laboratory Supplies and Equipment

Carolina School Supply Co., Inc.[1], P. O. Box 2185, Charlotte, N. C.

Walker C. Cottrell, Jr., 408 E. Main St., Richmond 19, Va.

Dixie Equipment Co., P. O. Box 1026, Liberty, N. C.
Gregson Manufacturing Co. (School and Office Furniture)
Griggs Equipment Co. (School and Auditorium Furniture)
Folding Tables and Chairs
Complete Line of School Furniture

Roy G. Epperly & Co.[3], 725 12th Street, N. W., Washington 5, D. C.

"The" Film Center[2], 915 Twelfth St., N. W., Washington, D. C.

Flowers School Equipment Co.[1, 2], 327 West Main St., Richmond 20, Va.

Wilson Gill Motion Picture Service[2], 1217 Eye St., N. W., Washington 5, D. C.

Henry B. Gilpin Co.[3], 128-33 W. Main St., Norfolk 10, Va.

M. W. Gunn Co., P. O. Box 152, Orangeburg, S. C.
Distributor: Griggs School Seating—classroom furniture, auditorium seating, window shades

Harbin's Inc.[1], 1312 Main St., Columbia 1, S. C.

Ideal Pictures[2], 219 E. Main St., Richmond 19, Va.

Jones School Supply Co., Columbia, S. C.

L. D. Lawrence Co., Inc.[1], 937 Main St., Columbia 1, S. C.

National School Supply[2], 14 Glenwood Ave., Raleigh, N. C.

Nu-Idea School Supply Co.[1], 127 Harvin St., Sumter, S. C.

Palmetto Pictures, Inc.[2], 721 Saluda Ave., Five Points, Columbia 11, S. C.

Paulco Electronics[2], 400 Glenwood Ave., Raleigh, N. C.

J. H. Pence Co.[1], 119 E. Church Ave., Roanoke, Va.

Phipps & Bird, Inc.[3], P. O. Box 2V, Richmond, Va.
Chemicals
Laboratory Apparatus
Laboratory Furniture

Piedmont Film Service[2], Box 391, Lexington, N. C.

Southeastern Equipment Co., Inc.[1], Silver City, N. C.

Southern Desk Co., Drawer 630, Hickory, N. C.

Southern School Service, Inc.[1], P. O. Box 323, Canton, N. C.

Southern School Supply Co.[1], 108 S. Harrington St., Raleigh, N. C.

Universal School Equipment Co.[1], 3709 Hillsboro St., Raleigh, N. C.

Virginia School Equipment Co., Inc.[1], 104 South Foushee St., Richmond 20, Va.

Washington School Supply Co., 511 Westlake, North, Seattle 9, Wash.
Cram Maps—Globes—Atlases
Rice Steel Roller Window Shades
Wolber Duplicators and Supplies
Duraline Classroom Furniture
Complete Supply and Equipment Line

A. D. Whitney Co., Inc.[1], 733 W. Cary St., Richmond 20, Va.

Will Corporation[3], 5802 Georgia Ave., N. W., Washington, D. C.

Region 6—Tennessee, Mississippi, Alabama, Georgia and Florida

Alabama Photo Supply[2], 15 South Court St., Montgomery, Ala.
Coronet Films—Film Rentals
Repairs To All Equipment
Bell and Howell Special Representative
Eastman Kodak Co.
American Optical Co.

Alabama School Supply Co.[2], 945 N. McDonough St., Montgomery 1, Ala.

Aloe Scientific Division of A. S. Aloe Co., 492 Peachtree St., N. E., Atlanta 3, Ga.
Laboratory Instruments, Apparatus and Chemicals

American Seating Co.[1, 2], 354 Nelson St., S. W., Atlanta 3, Ga.
School Supplies
Sunday School Furniture
Theatre and Auditorium Seating
Church Furniture
Stadium Seating
Folding Chairs
Folding Tables
Universal Bleachers
Gymnasium and Playground Equipment
Window Shades
Stage Equipment
Home Economics Equipment

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Anderson Surgical Supply Co.[3], 40-42 West Duval St., Jacksonville 1, Fla.

Atlantic Scientific Corp.[3], Michigan Avenue & RR, Orlando, Florida
J. T. Baker Reagent Chemicals
Bausch & Lomb Optical Co. Opaque Projectors and Slides and Microscopes
Pyrex and Kimble Glassware
Christian Becker, Voland and Seko Balances
Labline Laboratory Unitized Furniture
General Laboratory Supplies

Audio Visual Training, Inc.[2], 1469 S. W. 1st St., Miami, Fla.

Biscayne Chemical Laboratories[3], 200 N.E. 11th St., Miami 32, Fla.

Bishop Office Equipment, Inc.[1], 204 N. Orange Ave., Orlando, Fla.

Bowen Supply Co.[1], 125 E. Reynolds St., Plant City, Fla.

Bowstead Movie Camera Shop[2], 1039 N. Orange Ave., Orlando, Fla.

Milton Bradley Co. of Ga., Inc., 384 Forrest Ave., N. E., Atlanta, Ga.

Calhoun Co.[2], Visual Education Service, 235 Ponce de Leon Ave., N. E., Atlanta, Ga.
Complete Audio Visual equipment and material

Churchwell's[2], 707 Court St., Savannah, Tenn.

The Distributor's Group, Inc.[2], 756 W. Peachtree St., N. W., Atlanta, Ga.

H. & W. B. Drew Co., P. O. Box 270, Jacksonville, Fla.
Globe-Wernicke Equipment
Norcor Seating
Weber Costello, Blackboard, Chalk and Erasers
Niagara, Duplicators
Printing-Lithographing-Engraving

Educational Aids, 618 Washington Ave., Greenville, Miss.
DeVry Corporation
Victor Animatograph Corp.
Viewlex, Inc.
Three Dimension Company
Automatic Projection Corporation
Da-Lite Screen Co., Inc.
Revere Camera Company
Ampex Corporation
Hamilton Electronics Co.
Califone Corporation
Headquarters for Photographic & Audio-Visual Supplies

Estes Surgical Supply Co.[3], 56 Auburn Ave., N. E., Atlanta, Ga.

Evans Motion Picture Co., 2019 Third Ave., Birmingham 3, Ala.

Jasper Ewin & Sons[2], 227 E. Pearl Street, Jackson, Miss.

Florida Audio-Visual Service[2], 3109 Bay-to-Bay, Tampa, Fla.

James A. Head & Co., 2013 First Ave., N. Birmingham 3, Ala.
Complete Institutional Equipment for Schools, Libraries, Hospitals and Churches

Highland Products Co.[1], 720 Gay St., Knoxville 8, Tenn.

Kiemer Visual Service[2], 200 S. Adams, Tallahassee, Fla.

Knight Brothers Paper Co.[1], School Serv. Div., Station G, Box 52, Jacksonville, Fla.

Marshall Co.[1], 29 Pryor St., Atlanta, Ga.

Martin School Equipment Co.[1], 303 E. Hamilton St., Jackson 109, Miss.
American Desk Mfg. Co., School and Auditorium Seating
Howell Playground Equipment
Mitchell Fold-o-Leg Tables, Band and Choral Stands
Peabody Seating Company, School Furniture—Stadium Seating
J. E. Porter Corporation, Basket Ball Backstops, Playground Equipment
Samson Folding Chairs and Tables
School, Church and Public Seating—Dormitory Furniture
E. H. Sheldon & Company, Laboratory and Homemaking Equipment
Simmons Company, Hotel Contract Dealer, Dormitory Furniture
Wayne Rolling Gymstands and Bleachers

Tony Martucci Co.[2], Orlando, Fla.

McGregor Co.[1], P. O. Box 752, Athens, Ga.

Medical Supply Co.[3], 220 N. E., 3rd St., Miami 32, Fla.

Mississippi School Supply Co.[1, 2], 116 E. South St., Jackson, Miss.
Audio-visual equipment—Ampro projectors
Full line school furniture and supplies
Church furniture and outfitter for courthouses
Laboratory equipment and library books
Folding chairs and tables—shades

Modern Talking Picture Service, Inc.[2], 247 Spring St., S. W., Atlanta 3, Ga.

John R. Moffitt Co., Inc.[1, 2], 108 N. McDonough St., Montgomery, Ala.

Nashville Product Co.[1], 158 Second Ave., N., Nashville, Tenn.

Nashville Surgical Supply Co.[3], 401 Church St., Nashville 3, Tenn.

Newton School Equipment Co.[1, 2], P. O. Box 4334, Jacksonville, Fla.

Norman Laboratories & Studio[3], Arlington Suburb, Jacksonville, Fla.
Authorized Holmes Projector Dealer 16-35 mm
Da-Lite Projection Screens
Neumade Storage and Production Products

Orben Pictures[2], 1615 Hendricks Ave., Jacksonville, Fla.

Photo-Sound Co.[2], 166 Church St., Post Office Box 63, Montgomery 4, Ala.
Bell & Howell, Special Representatives
DuKane, Tape Recorders, Projectors and Sound Systems
General Electric, Projection and Photo Lamps
"Scotch" Sound Recording Tape
16mm Sound Film Rental Library

Photocraft[2], 12 W. State St., Savannah, Ga.

Powers Co., 106 St. Michael St., Mobile 1, Ala.

School and Office Supply Co., 407 W. Clinch Ave., Knoxville, Tenn.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Seban, Inc.[2], 404-11th St., Columbus, Ga.
Complete Audio-Visual Sales and Service

Herschel Smith Co.[2], 119 South Roach St., Jackson 5, Miss.
Audio-Visual Service and Rental Film Library

Southern Photo & News[2], 608 E. Lafayette St., Tampa, Fla.

Southern Scientific Co.[3], 890 New Chattahoochee Ave., N. W., Atlanta, Ga.

Southern Visual Films[2], 686 Shrine Bldg., Memphis, Tenn.

Standard School Service[1, 2], Box 3057, 3827 First Ave., W., Birmingham 6, Ala.

Stevens-Pictures[2], 9536 N. E. Second Ave., Miami, Fla.
R. C. A. Distributors

Strickland Film Co.[2], Box 14, North Side Station, Atlanta 5, Ga.

Tampa Movie Center[2], 228 S. Franklin St., Tampa 3, Fla.

Taylor Paper Co.[1], 420 S. Front St., Memphis, Tenn.

Technical Products Co.[3], 19 N. Dunlap St., Memphis, Tenn.

Tennessee Equipment & Supply Co.[1], 116 2nd Ave., N., Nashville, Tenn.
Medart Products, Inc., Gymnasium Equipment
Leonard Peterson & Co., Science & Library Equipment
Peabody Seating Co., Classroom and Auditorium Seating
DeVry Projectors & All Types Audio-Visual Equipment
Schieber Mfg. Co., In-Wall Folding Tables
Samson Folding Chairs

Tennessee Office Supply Co., 203 West Clinch Ave., Knoxville, Tenn.

Thompsons Teaching Aids[2], Div. of Snap Shop, Inc., 615 S. Gay St., Knoxville 2, Tenn.

Virginia School Equipment Co., Inc., 104 S. Foushee, Richmond 20, Va.

Region 7—N. & S. Dakota, Iowa, Minnesota, Wisconsin, Upper Michigan and Manitoba, Canada

Aloe Scientific, Division of A. S. Aloe Co.[2], 927 Portland Ave., Minneapolis 4, Minn.
Laboratory Instruments, Apparatus and Chemicals

Artz Camera Supply Co.[2], 416 South Main St., Aberdeen, S. D.
Kodak Pageant and Bell & Howell Sound Projectors
SVE and Viewlex Slide and Filmstrip Projectors
Ampro, DuKane, Webcor and Revere Tape Recorders
Complete Repair Service
Da-Lite and Radiant Screens

Blackhawk Films[1], 515-519 Main Street, Davenport, Iowa

Brosk Office Supply[1], 5810 Seventh Ave., Kenosha, Wis.
Heywood-Wakefield School Furniture
Samson Folding Chairs; Midwest Tables and Caddies
Imperial Desks; Standard School Chairs
Cram Maps and Globes
Complete line School & Janitor Supplies

Cairo Camera Shop[1], 5815-11th Ave., Kenosha, Wis.

Carroll Films[2], 535 Andros Bldg., Minneapolis, Minn.

Christie School Supply, Ltd.[1], P. O. Box 300, Brandon, Manitoba, Canada
Complete school supplies and equipment
Science Apparatus and chemicals
American Seating Co. School furniture
Weber Costello Co. Chalkboards, Maps & Globes
Canadian Office & School Furniture Ltd.

Cinarco Visual Service Co.[2], 312 Main St., Davenport, Iowa

Colborn School Supply Co.[1], Grand Forks, N. D.
Branch: Billings, Montana
Classroom and Office Furniture
Janitor Supplies and Equipment
Audio-Visual Aids
Stage and Auditorium Furnishings
Team and Sports Equipment
Laboratory and Science Equipment

Community Camera Center[2], 506 Main St., La Crosse, Wisc.

Decker Brothers, Inc.[2], 209 N. Federal Ave., Mason City, Iowa

Eastin Pictures Company, 515-519 Main St., Davenport, Iowa

Eau Claire Book & Stationery Co.[1], Eau Claire, Wisc.
American Crayon Co.
American Seating Co.
Berger steel lockers
Ditto, Inc., duplicators and supplies
Luther O. Draper window shades
Jam Handy Slidefilms and motion picture films
Leavitt knockdown and telescoping bleachers
Writing & Bulletin Boards
Tell City school chairs
Complete school supplies and equipment

E. L. C. Films[2], 57 South 4th St., Minneapolis, Minn.

J. W. Edgerly & Co., Ottumwa, Iowa

Educator Supply Co.[1], 309-11 N. Lawler, Mitchell, S. D.
Virco Mfg. Corp. School Furniture & Steel Folding Chairs
Cram Maps and Globes
Leonard-Peterson Laboratory Equipment
Weber-Costello Co. Products
Jasper Wood Furniture
Complete Supply and Equipment Service for schools since 1890

Elliott Film Co.[2], 1112 Nicollet Ave., Minneapolis 3, Minn.

Farnham Stationery & School Supply Co.[1], 301 S. 5th St., Minneapolis, Minn.

Five Star Pictures[2], Lyons, Wisc.

R. H. Flath Co.[2], 2410 N. 3rd St., Milwaukee 12, Wisc.

Fond du Lac School Supply Co.[1], 36 S. Main St., Fond du Lac, Wisc.

Gallagher Films[2], Bay Theatre Bldg., 11 S. Washington, Green Bay, Wisc.

Hart Audio-Visual Center[2], 26 N. First Ave., E. Duluth 2, Minn.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Hawkins Chemical Co.[3], 3100 East Hennepin Ave., Minneapolis 13, Minn.

Herter's Inc., Waseca, Minn.

Holley School Supply Co.[1], 100 E. Grand Ave., Des Moines 7, Iowa

Hub City School Supply Co.[1], Box #39, Aberdeen, S. D.
Peabody Seating Company, School Furniture
Kewaunee Laboratory Equipment
Luther O. Draper Window Shades
Lyon Metal Products
Heyer Spirit Duplicators and Supplies

Hunts Supply Co.[1], Wautoma 1, Wisc.

Iowa Audio-Visual Center[2], 11th & Douglas, Sioux City, Iowa

Laabs, Inc.[3], 1937 W. Vliet St., Milwaukee 5, Wisconsin
Laboratory Equipment & Chemicals

J. S. Latta & Son[1, 2], 2218 Main St., Cedar Falls, Iowa
Complete school supply and equipment line

Marshfield Book & Stationery Co.[1], Marshfield, Wisc.
Irwin Seating Co.—School Desks
Howell Playground Equipment
Charles L. Rice Window Shades
Shaw Walker Office Equipment
Royal Typewriter Sales and Service
National Adding Machines

Metropolitan Supply Co.[1], 602-616 Third St., S. E., Cedar Rapids, Iowa

Meur Photoart House, Inc.[3], 411 State St., Madison, Wisc.
RCA Audio Visual Products
Bell & Howell, Ampro Sound Projectors
Filmstrip and Slide Projectors
American Optical Co.—Projectors
Tape Recorders & Accessories
8 mm & 16 mm Film Rental Libraries
Technical Service Facilities for all equipment

Midwest Audio-Visual Co.[2], 10 West 25 St., Minneapolis 4, Minn.

Midwest Beach Co.[1], 222 S. Phillips Ave., Sioux Falls, S. D.

Midwest Visual Education Service[2], 2819 Arbor St., Ames, Iowa

Minneapolis School Supply Co.[1], 173 N. W. Bank Bldg., Minneapolis, Minn.

Museum of Visual Materials[2], Yankton, S. D.

National Camera Exchange[2], 86 S. 6th St., Minneapolis, Minn.

National Equipment Co.[3], 7 E. Michigan St., Duluth 2, Minn.

Northern Distributors[2], Big Lake, Minnesota

Northern School Supply Co.[1, 3], N. P. Ave. and Eighth St., Fargo, N. D.
American Seating Company, school furniture
Bell & Howell Company, projection equipment
Ditto duplicator and supplies
Draper shades
Medart gymnasium seating and equipment
Mitchell Fold-o-Leg tables, band and choral stands
E. H. Sheldon and Company, laboratory equipment
Stagecraft, draperies, hardware and lighting
Weber Costello Company, Hyloplate and Sterling Litesite

Northwest Products Co., 127 W. 10th St., Sioux Falls, S. D.

Northwest Projector and Film Supply[2], 319 E. Central Ave., Minot, N. D.

Photoart Visual Service[2], 844 N. Plankinton Ave., Milwaukee, Wisc.
Audio-Visual equipment and sound systems

Pratt Sound Films, Inc.[2], 720 Third Ave., S. E., Cedar Rapids, Iowa

Range Office Supply & Equipment Co., 319 Chestnut St., Virginia, Minn.

J. W. Rhea, 911 Locust Street, St. Louis 1, Missouri

Roa's Films, 840 N. Plankinton Avenue, Milwaukee 3, Wisc.
Film Rental Library, Filmstrips

Roll-Up Shade-o-Screen Co., 1120 High St., Des Moines, Iowa

St. Paul Book & Stationery Co.[1, 2], 55 E. Sixth St., St. Paul 1, Minn.

Sioux Falls Book & Stationery Co.[1], 117-19 N. Phillips Ave., Sioux Falls, S. D.

Taylor Films[2], 79 Third St., Huron, S. D.

Tip Top Visual Service[2], 1403 Travis St., La Crosse, Wisconsin

Twin City School Supply Co., Neenah, Wisc.

United Chemical Co.[1], 2115 Como Ave., S. E., Minneapolis, Minn.

Upper Peninsula Office Supply Co.[1], Marquette, Mich.

Visual Aid Center[2], 1657 Pennsylvania St., Denver 3, Colo.

Geo. T. Walker & Co.[3], 324 Fifth Ave., S., Minneapolis, Minn.

Wisconsin Sound Film Library[2], 3201 W. North Ave., Milwaukee 8, Wisc.
Cathedral Films—Films & Filmstrips
Church Craft Pictures—Films & Filmstrips

Region 8—Missouri, Kansas, Nebraska, Colorado

The Acme Chair Co. of St. Louis[1], 3230 Washington Blvd., St. Louis, Mo.

Akin & Bagshaw[2], 2027 E. Colfax Ave., Denver 6, Colo.

Aloe Scientific, Division of A. S. Aloe Co.[3], 5655 Kingsbury Ave., St. Louis, Mo.
Laboratory Instruments, Apparatus and Chemicals

Aloe Scientific, Division of A. S. Aloe Co.[3], 4128 Broadway, Kansas City 2, Mo.
Laboratory Instruments, Apparatus and Chemicals

American School Supply Co.[1], 1514 Arapahoe, Denver, Colo.

Frank Bangs Co.[2], 315 No. Emporia, Wichita, Kan.

Blackwell Wielandy Co.[1], 1601 Locust St., St. Louis, Mo.

Bowlus School Supply Co.[1], 1015 N. Broadway, Pittsburg, Kan.
American Desk Mfg. Co., Furniture
Durham Folding Chairs
DeVry Sound Projectors
Educators Furniture Supplies
Complete School and Athletic Supplies

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Brains Store[2], 1115 Nicholas St., Omaha 2, Neb.

Buxton & Skinner Printing & Stationery Co.[1], 306 N. 4th St., St. Louis, Mo.

Calandra Camera Co., Inc.[2], 116 N. 42nd Street, Omaha 2, Neb.

Centenial School Supply Co.[1, 2], Box 5224 Terminal Annex, 2988 Huron St., Denver 17, Colo.

Church Film Service, 6509 No. 32nd St., Omaha 11, Neb.
16mm sound projectors and accessories
Viewlex and S.V.E. filmstrip projectors
Radiant screens
16mm film rental service, specializing in religious and educational films

Colorado Visual Aids Supply[2], 1624 Broadway, Denver 3, Colo.

Davis Audio Visual Co.[2], 2023 E. Colfax Ave., Denver 6, Colo.

The Edwards Press[1], Osceola, Mo.

Embassy Enterprise, Inc.[2], 7366 Winchester Drive, St. Louis 5, Mo.

Erker Bros. Optical Co.[2], 908 Olive St., St. Louis 1, Mo.

Francis Audio-Visual Service[2], Box 12, Springfield, Mo.

Goldsmith Book & Stationery Co., Wichita 1, Kan.

A. J. Griner Co.[3], 1827 McGee St., Kansas City 8, Mo.
Laboratory equipment & supplies
Microscopes
Reagent Chemicals
Kimble & Pyrex glassware
Laboratory furniture

Hall's[2], 623 Kansas Ave., Topeka, Kan.

B. R. Harris & Co.[1, 2], 722 Washington St., Chillicothe, Mo.

Heil Corp.[3], 210 S. 4th St., St. Louis, Mo.

Hicks-Ashby Co.[1], 210 W. 8th St., Kansas City, Mo.

Hoover Brothers[1, 2], 1020 Oak St., Kansas City, Mo.

D. E. Hotchkin, Maryville, Mo.

Ideal Pictures Corp.[2], 714-18th St., Denver, Colo.

Kansas City Laboratory Supply Co.[3], 307 Westport Rd., Kansas City 11, Mo.

J. G. Kretschmer & Co.[2], 315 S. 17th St., Omaha 2, Neb.
Bell & Howell Projectors, Cameras, Lenses and Repairs
Beseler and American Optical Projectors
Filmstrips of all kinds, combination filmstrip and 2 x 2 Projectors, Lamps, Records
Recording tape, P. A. systems, Tubes, Audio-visual and Photo supplies

Lassiter Reminder Co.[2], Uptown Theatre Bldg., Columbia, Mo.

Lawrence Camera Shop, Inc.[2], Box 1597, Wichita 1, Kansas

Ed McClure Co.[1], 601 Walnut St., Kansas City 6, Mo.

Millard-Heath Co.[3], 325 Olive St., St. Louis, Mo.

Mine & Smelter Supply Co.[3], 1422 17th St., Denver 17, Colo.

The Missouri Store Co., 909 Lowry St., Columbia, Mo.

Modern Films[2], 583 S. York St., Denver, Colo.

Modern Sound Pictures, Inc., 1410 Howard St., Omaha 2, Neb.
Nation-wide film rental library of features and short subjects
Bell & Howell Audio-Visual Equipment
Radiant Projection screens
Projection Tables, Cameras, Reels and Projection Lamps
Coronet and E. B. Instructional Films

Mo-Kan Audio Visual Service[2], 709 Westport Rd., Kansas City 2, Mo.

Mosser-Wolf, Inc.[2], 1107 Massachusetts, Lawrence, Kan.

National Chair & Furniture Co.[1], 1151 South Broadway, St. Louis 4, Mo.

Omaha School Supply Co.[1], 1113 Nicholas St., Omaha, Nebr.
Peabody School Seating
Leonard Peterson Laboratory Equipment
Hubert Mitchell—Stage Curtains
Binney & Smith Company—Art Materials
Weber Costello Chalkboard & Maps
School Supplies & Equipment

Pictosound Movie Service[2], 4010 Lindell Blvd., St. Louis 8, Mo.

J. W. Rhea, 911 Locust Street, St. Louis 1, Missouri

School and Park Supply Co., Inc.[1, 2], 1650 S. Broadway, Wichita 11, Kan.

Sight and Sound Co.[2], 320 E. 13th St., Kansas City 6, Mo.

Southwest Scientific Corp.[3], 122 S. St. Francis St., Wichita, Kan.
Pyrex and Kimble Glassware
Mallinckrodt and Merck Reagent Chemicals
Mathewson-Coleman & Bell Organic Chemicals
Precision Scientific Equipment
General Laboratory Supplies and Equipment

Stephenson School Supply Co.[1], 935 O St., Lincoln, Neb.
School Furniture
RCA Sound and Visual Products
Viewlex Projectors
Universal Bleachers
E. H. Sheldon Laboratory Equipment
Draper Shades
Samson Folding Chairs
Stage Equipment

Sterling School Supply Co., Sterling, Kansas

Swank Motion Pictures[2], 614 Skinker Blvd., St. Louis 5, Mo.

Thacher, Inc.[2], 424 Quincy, Topeka, Kan.
Peabody School Equipment
Mitchell Stage Installations
E. H. Sheldon Laboratory and Home Economics Equipment
Draper Shades
Rol-Fol Table, Inc.
Samson Folding Chairs

The University Publishing Co.[1, 2], Superior School Supply Co., 1126 Q St., Lincoln 1, Neb.
Branch: 1917 Main, Kansas City, Mo.
Audio Visual Equipment & Supplies
DeVry sound projectors
Ditto duplicating machines and supplies
Heywood-Wakefield school and auditorium seating
Porter Playground and gym equipment
Wayne gym stands and bleachers
Complete supply and equipment lines

Visual Aid Center[2], 1657 Pennsylvania Street, Denver 3, Colorado

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Region 9—Washington, Oregon, Idaho, Montana, Wyoming, Alberta, Canada

Aloe Scientific, Division of A. S. Aloe Co.[2], 1920 Terry Ave., Seattle 1, Wash.
Laboratory Instruments, Apparatus and Chemicals

Audio Visual Center, Inc.[2], 1205 North 45th St., Seattle, Wash.

Audio Visual Consultants, Inc., South 17 Washington, Seattle, Wash.

Audio Visual Consultants, Inc., 305 North 9th St., Boise, Ida.

Bailey School Supply, Casper, Wyo.

The Caxton Printers, Ltd., 312 Main St., Caldwell, Ida.

Christian Supply Center, Inc., 825 S. W. Fourth Ave., Portland 4, Ore.
RCA Audio-Visual Equipment
De Vry Corporation

Cine Craft Co.[2], 1111 S. W. Stark St., Portland 5, Oregon

Colborn School Supply Co.[1], 2705 Minn. Ave., Billings, Mont.

Davis Audio Visual Co.[2], 2023 E. Colfax Ave., Denver 6, Colo.

Dimensions, Inc.[2], 1408 E. 43 St., Seattle 5, Wash.

H. P. Evans Audio Visual Consultants[2], 305 N. 9th St., Boise, Ida.

C. M. Fassett Co.[3], W. 9 Trent Ave., Spokane 1, Wash.
General Laboratory Apparatus and Chemcials
Microscopes and Microprojectors
Biological Supplies
Physics Apparatus
Instrument Repair

Fryer-Knowles, 1718 Broadway, Seattle, Washington
Rol-Fol Table, Inc.
Horn Brothers Folding Gymnasium Seating, Folding Gymnasium Partitions, and Folding Stages
Supreme Steel Metal Lockers

J. K. Gill Co., 408 S. W. Fifth Ave., Portland, Ore.
Branch: 2005 Third Avenue, Seattle 1, Wash.
A. B. Dick Duplicating Products
Norcor Mfg. Co.—School Furniture
Peabody Seating—School Auditoriums
Peterson Laboratory Furniture
Globe-Wernicke Files and Desks
Jasper Office Furniture
Milton Bradley Co.
American Crayon Co.
Indiana Chair
Gametime, Inc., Playground, Gym Equipment
Textbook Depository for 66 Publishers
Serving Oregon, Washington and Alaska

John W. Graham Co., 708 Sprague Ave., Spokane, Wash.

W. Hassell Electronics[2], 417 W. Yakima Ave., Yakima, Wash.

Inland Audio-Visual Co., N. 2325 Monroe St., Spokane 17, Wash.
Audio-Visual equipment and supplies

Johnson's Inc., 23 S. Mission St., Wenatchee, Wash.

Kingsway Film Equipment, Ltd.[2], 4 Dominion Bldg., Edmonton, Alberta, Canada

Eddie Lewis Motion Pictures[2], 495 Ferry St., Salem, Ore.

Lowman & Hanford Co., 1515 2nd Ave., Seattle, Wash.

Moore's Motion Picture Service[2], 306-10 S. W. 9th Ave., Portland 5, Ore.

Northern School Supply Co.[1, 2], 1505 Lovejoy St., N. W., Portland 9, Ore.
Branches: 2603 First Ave., Seattle, Wash.; S. 124 Wall St., Spokane, Wash.; Great Falls, Mont.
American Crayon Co.
American Seating Co., school furniture
Armstrong Cork Bulletin Boards
Duplicators and supplies
Draper shades
Medart gymnasium seating and equipment
E. H. Sheldon & Co., Laboratory and homemaking equipment
Rol-Fol Table, Inc.
Stagecraft draperies, hardware and lighting
Victor cameras and projectors
Weber Costello Co. Hyloplate and Sterling Litesite

F. E. Osborne Limited[1], 112 8th Ave. W., Calgary, Alberta, Canada

Owens Motion Picture Service, Inc.[2], 1014 S. W. 2nd Ave., Portland 4, Ore.

Rarig Motion Picture Co.[2], 5514 University Way, Seattle 5, Wash.

Rosser & Sutton, P. O. Box 1292, Yakima, Wash.

Scientific Supplies Co.[3], 123 Jackson St., Seattle, Wash.

Shaw Surgical Co.[3], 620 S. W. 11th Ave., Portland, Ore.

B. F. Shearer Co.[1], 2318 Second Ave., Seattle, Wash.
Branch: 1947 N. W. Kearney, Portland, Ore.
243 Golden Gate Ave., San Francisco, Calif.
1946 South Vermont, Los Angeles, Calif.
Heywood-Wakefield School Furniture
Heywood-Wakefield Auditorium Chairs
Stage Draperies, Hardware and Lighting
Indiana Desks
Clarin Folding Chairs
Jasper Chairs

Guy V. Sweet Company, 2106 E. 65th Street, Seattle 5, Wash.
Erickson Fold-A-Way Tables with Benches
Emco Wardrobes
Hamilton Laboratory Furniture and Drawing Tables
Ideal Seating Company Auditorium Chairs
Sjostrom Library Furniture and Manual Training Benches
Vogel-Peterson Hat and Coat Racks

Utah-Idaho School Supply Co.[1], 511 Westlake Ave., N. Seattle 4, Wash.

Washington School Supply[1], 511 Westlake Ave. N., Seattle 4, Wash.
Cram Maps—Globes—Atlases
Rice Steel Roller Window Shades
Wolber Duplicators and Supplies
Brunswick School Furniture
Complete Supply and Equipment Line

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Region 10—California, Arizona, Nevada, New Mexico, Utah

Academy Motion Picture Service[2], 2904 Ross Ave., Alhambra, Calif.

Allen School Supply Co., 58 S. MacDonald St., Mesa, Ariz.

A. S. Aloe Co.[3], 1150 S. Flower St., Los Angeles, Calif.
Laboratory Instruments, Apparatus and Chemicals

Aloe Scientific, Division of A. S. Aloe Co., 500 Howard St., San Francisco 5, Calif.
Laboratory Instruments, Apparatus and Chemicals

American Paper & Supply Co.[1], 444 S. 2nd West, Salt Lake City 4, Utah

Armanko Office Supply Co., 152 N. Virginia St., Reno, Nev.

Association Films, 351 Turk St., San Francisco, Calif.

Audio Film Center, 522 Clement Street, San Francisco, Calif.

Austin Bentley Seating Co.[1], 529 N. La Cenega Blvd., Los Angeles 48, Calif.

Austin Safe & Desk Co., Ltd., 1320-5th Ave., San Diego, Calif.

J. M. Boyd Co., 2032 S. Vermont Ave., Los Angeles 7, Calif.
Motion Picture Equipment
Audio-Visual Supplies & Classroom Darkening Drapes

The Braun Corp.[3], 2260 E. 15th St., Los Angeles, Calif.

Braun-Knecht-Heimann Co.[3], 1400 16th St., San Francisco, Calif.

(Northern California) Character Guidance Films[2], 2120 Tiffin Rd., Oakland 2, Calif.

Frank Church Films, Inc.[2], 6117 Grove St., Oakland 9, Calif.

Donald J. Clausonthue[2], 1829 N. Craig Ave., Altadena, Calif.

Clico Laboratory and X-Ray Supplies, 335 West McDowell Rd., Phoenix, Ariz.

Coast Visual Education Co.[2], 5620 Hollywood Blvd., Hollywood, Calif.

Cottage Films[2], 13061 South Jefferson, Garden Grove, Calif.

H. S. Crocker Co., Inc.[1], 720 Mission St., San Francisco 1, Calif.
Branches: 1141 Fulton St., Fresno 16, Calif., 1201—"K" St., Sacramento 14, Calif.
Arlington Seating School Furniture
Virco Mfg. Corp. School Furniture
Ozalid "Bambino" Reproducing Machines
Ditto Duplicators & Supplies
Globe-Wernicke Files—Desks
Wilson Athletic Supplies & Equipment
Complete Line of Supplies & Equipment

W. M. Dennis Film Libraries[2], 2506½ W. 7th St., Los Angeles, Calif.

Deseret Book Co.[2], 44 E. South Temple, P. O. Box 958, Salt Lake City 10, Utah; Audio Visual Dept., 1400 Indiana Ave.
Bell and Howell special representative
Audio-visual equipment: sales and services
Film rental library: educational and entertainment selections
Screens, tape recorders, film-strip, opaque and slide projectors

Donald Reed Motion Service[2], Beverly Hills, Calif.

Ecker's Projection Sales[2], 270 S. Main, Salt Lake City, Utah

Educators Furniture and Supply Co., Inc., 5912 "R" St., Sacramento 17, Calif.
Educators Functional Classroom Furniture and Classroom Cabinets

Robert J. Eiel & Associates, 2408 W. 7th St., Los Angeles, Calif.

Caswell C. Elkins Co., 835 Santa Barbara Rd., Berkeley 7, Calif.

Herbert Elkins Co.[2], 10031 Commerce Ave., Tujunga, Calif.

Adolph Frese Corp.[3], 116 W. 17th St., Los Angeles, Calif.

Fresno Camera Exchange, Audio Visual Dept.[2], 2037 Merced St., Fresno 21, Calif.
Eastman Kodak Audio-Visual Dealers
"Pageant" Projectors
SVE Filmstrips and Equipment
Popular Science Filmstrips and Records
American Optical A-V Projectors
Westinghouse Projection Lamps

Schwabacher Frey Co., 735 Market St., San Francisco, Calif.

Gateway Productions, Inc.[3], 1859 Powell St., San Francisco 11, Calif.

Harshaw Scientific[3], Div. of Harshaw Chemical Co., 3237 S. Garfield Ave., Los Angeles 22, Calif.
Laboratory Instruments, Apparatus, and Chemicals

Kenneth L. Holst Audio Visual Education Service[2], 1399 N. Lake, Pasadena 6, Calif.

Jamison Manufacturing Co., 8770 Mettler St., Los Angeles 3, Calif.
Recreation and Playground Equipment
Baseball and Basketball Backstops
Benches, Tables, Flagpoles, Bike Racks
Outdoor Flying Ring Sets, Parallel Bars
Sa-F-Lite Swing Seats

Kelton Audio Equipment Co., 808 N. First St., Phoenix, Ariz.

Knight's Library[2], 527 University Ave., San Diego 3, Calif.

Marin Motion Picture Service[2], 8 Francisco Blvd., San Rafael, Calif.

Marston Supply Co.[1], 324 N. Central Ave., P. O. Box 1390, Phoenix, Ariz.

McCurry Foto Co.[2], 8th & Eye Sts., Sacramento 14, Calif.

Tillman J. Meadows Co.[2], 20 E. Acacia St., Stockton, Calif.

Merkle Film Library[2], 1734 Pacific Ave., Long Beach, Calif.

A. F. Milliron Co.[2], 346 S. LaBrea, Los Angeles, Calif.

Morris Brothers, 15 N. Hunter St., Stockton 6, Calif.

Movie Center, Inc.[2], 119 W. McDowell Rd., Phoenix, Ariz.

National Research & Chemical Co.[3], 1516 Industrial Street, Los Angeles 21, Calif.

New Mexico School Supply Co.[2], 205 W. Copper Ave., Albuquerque, New Mexico

Pacific Laboratory Div. of Central Scientific Co. of Calif.[3], 3555 Whittier Blvd., Los Angeles 23, Calif.

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

PBSW Supply & Equipment Co.[1], Box 551, Phoenix, Ariz.

Photo & Sound[3], 116 Natoma St., San Francisco, Calif.
Bell & Howell Special Representative
RCA Audio-Visual Products—Dukane Projectors
Eastman Kodak Audio-Visual Dealer
Beseler Projectors—Popular Science Filmstrips
Viewlex Projectors—Jam Handy Filmstrips
Webster-Electric Ekotapes—Film Rental Library

Carroll W. Rice Co.[3], 424-40 St., Oakland 9, Calif.

School & Sports Supply Co.[1], 220 N. Seventh Ave., Phoenix, Ariz.

Screen-Ets, 9812 Wanda Park Drive, Beverly Hills, Calif.

Sequoia Audio-Visual & School Supply Co., 1055% Brewster, Redwood City, Calif.

Howard K. Smith Films, Inc.[2], 2408 W. 7th St., Los Angeles 5, Calif.

Stationers Corp., 525 S. Spring St., Los Angeles, Calif.

Teaching Aids Exchange[2], 711 Sycamore Ave., Modesto, Calif.

Training Aids, Inc.[2], P. O. Box 798, 4515-17 Sepulueda Boulevard, Sherman Oaks, Calif.

University Apparatus Co.[3], 2229 McGee Ave., Berkeley, Calif.
Corning & Kimble Glassware
Mallinckrodt Chemicals
Coors Porcelain Ware
H. Reeve Angel & Eaton & Dikeman Filler Paper
Taylor & Weston Thermometers & Instruments
Glascol Heating Mantles
Clay Adams, Microscope Supplies & Dissecting Material
Eastern Stirrers & Pumps
Voland & Ohaus Balances & Weights
Precision Laboratory equipment
Rhoades & General Electric X-ray Timers
Meylan Stopwatches
Boekel Apparatus & Accessories
Beckman P. H. Meters
Oster & Waring Blenders
Physics, Biology & General Science Equipment

Utah-Idaho School Supply Co.[1], 155 S. State St., Salt Lake City, Utah

Valley Office & School Equipment Co.[1], 1426 P St., Bakersfield, Calif.

Westworth Co.[1], 415 W. Copper Ave., Albuquerque, N. M.

Western Surgical Supply Co.[3], 661 S. Burlington Ave., Los Angeles 5, Calif.

The Wholesale Supply Co.[3], 6500 Santa Monica Blvd., Los Angeles 38, Calif.
"Mallinckrodt" Analytical Reagent Chemicals
Photographic Chemicals
"Ecco" Anti-Static Film Cleaners
"Scotch" Tapes
"LePage's" Glues, Mucilage and Paste

Z.C.M.I. School & Office Supply, 57 South State St., Salt Lake City, Utah

Zellerbach Paper Co., 534 Battery St., San Francisco, Calif.

Region 11—Texas, Arkansas, Louisiana, Oklahoma

All State Supply Inc.[1, 2], 1401 W. Capitol Ave., Little Rock, Ark.

A. S. Aloe Co.[3], 1425 Tulane Ave., New Orleans 12, La.
Laboratory Instruments, Apparatus and Chemicals

American Desk Manufacturing Co.[1], P. O. Box 416, Temple, Texas
Public Seating
School Supplies and Equipment
Teachers Desks
Office Furniture

American Seating Co.[1], 2930 Canton St., Dallas, Texas
Branch: 1703 Bell Avenue, Houston, Texas

Association Films, Inc., 1915 Live Oak St., Dallas, Texas

Audio Video, Inc.[2], 2911 N. Haskell, Dallas 4, Texas

Audio Visual Services[2], 7102 Austin St., Houston 3, Texas

Bauer's Audio Video[2], Dallas, Tex.

Bickley Brothers[1], 2017 Preston, Houston 2, Tex.
Laboratory furniture, Elementary, High School, College
Gymnasium seating, basketball backstops, lockers
Auditorium Seating—fixed and folding chairs
School Classroom Furniture
Chalkboard, tackboard, trim

Boren-Malone Co.[1], 211 S. Wewoka Ave., Wewoka, Okla.
Athletic goods and sportswear
School supplies and equipment

Braunlich Equipment Co.[2], 936 S. Canton, Tulsa 12, Okla.

Central Manufacturing Co., 211½ Murray St., Alexandria, La.

Chemical & Laboratory Supply[3], Wichita Falls, Texas

Consolidated Drug Co.[3], 227 South Peters St., New Orleans 12, La.

Delta Visual Service[2], 815 Poydras St., New Orleans 12, La.

Democrat Printing & Lithographing Co.[1, 2], 114 E. 2nd St., Little Rock, Ark.

Dowling, Inc.[1, 2], 607-11 West Grand Ave., Oklahoma City, Okla.

Dowas School Supply & Equipment Co.[1], 216 E. 7th St., Tulsa 3, Okla.

Clarence J. DuBos & Sons[1], 3166 Chartres St., New Orleans, La.
American Desk School Furniture
Playground Equipment
Maps and Globes
Folding and Primary Chairs
Stage Scenery and Draperies

Education Equipment Co.[3], 840 Gibraltar Life Building, Dallas, Texas

Jasper Ewing & Sons[3], 725 Poydras St., New Orleans, La.
Bell & Howell Company, Projectors and Cameras
American Optical Co., Projection Equipment
Society for Visual Education, Filmstrips, Slides, Projectors
Squibb-Taylor Co., Opaque Projectors
DuKane Corp., Tape Recorders

Follis Visual Services[2], 2606 Fannin St., Houston 2, Texas

[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.

Greene Bros., Inc.[3], 1812 Griffin St., Dallas, Texas

Griggs Equipment Co.[1], Box 630, Belton, Texas
- Auditorium seating
- Movable chair desks
- Single Pupil tables and chairs
- Two Pupil tables and chairs
- Tablet arm chairs
- Kindergarten chairs
- Library tables
- Folding tables
- Stadium chairs

Grimm-Williams Co.[2], 115 W. 6th St., Little Rock, Ark.
- Audio-Visual Teaching Aids, Photographic & Sound Equipment

Gulf State Equipment Co.[1], 1305 S. Akard St., Dallas, Texas

John W. Gunstream[2], 3605 Wentwood Drive, Dallas 5, Texas

F. F. Hansell Bros., Ltd.[1], 131 Carondelet St., New Orleans 12, La.

Harshaw Scientific[3], Div. of Harshaw Chemical Co., 6622 Supply Row, Houston 11, Texas
- Laboratory Instruments Apparatus and Chemicals

Heister's School Supply[1], 214-216 Chickasha Ave., Chickasha, Okla.

Hertner's Camera Store[2], 114 West 6th Ave., Amarillo, Texas

W. C. Hixson Co.[3], 205 No. Austin St., Dallas 2, Texas; 1915 So. Shepherd Dr., Houston 19, Texas
- Kewaunee Laboratory Furniture and Hospital Casework
- Mutschler Cooking and Sewing Lab Cabinetry
- Deluxe Library and Storage Shelving (Steel)
- Medart Gym Seats, Lockers, Wardrobes, Basketball Backstops, Wire Baskets and Shelving
- New York Silicate Chalkboard, Tackboard and Display Cases
- Playtime Bleachers and Choral and Band Risers
- Acme Side Coiling Partitions (Gymnasiums and All-Purpose Rooms)
- Extendoor Folding Doors (Churches and Schools)
- Erickson Fold-A-Way Tables, Banquet Tables and Folding Choral and Band Risers
- Grade-Aid Steel Cubicles and Clay Carts
- Also: Folding Chairs, Locker Locks, Wood Wardrobes, Gymnasium Wall Padding, Etc.

Holmes & Tobett, Inc.[2], 611 N. E. St., Oklahoma City 6, Okla.

W. A. Holt Co., Inc., 113 N. 5th St., Waco, Texas

Hoover Bros., Inc.[1], Temple, Texas

Ideal Southern Pictures Co.[2], 3374 Nicholson Drive, Baton Rouge, La.

Industrial Scientific, Inc.[3], 1014 Taylor St., Fort Worth 1, Texas

Institutional Supply Co.[1], 1024 N. E. 23rd St., Oklahoma City 5, Okla.

Leistico's Visual Service, 2808 East Ave., Austin 5, Texas

Louisiana Education Service[2], Box 1386, Baton Rouge, La.

I. L. Lyons & Co.[3], 800 Techonpitoulas St., New Orleans, La.

Mallory's, 128 Clarksville St., Paris, Texas

Miller's Visual Aids, Inc.[2], 403 W. Magnolia, Fort Worth, Texas

Mine & Smelter Supply Co.[3], 410 San Francisco St., El Paso, Texas

George Mitchell Co.[2], 1420 Dragon St., Dallas 2, Texas

Modern Theater Equipment Co., 1916 Jackson St., Dallas, Texas
- Complete Theatre & Stage Equipment
- 16mm Equipment—Bell & Howell
- Rentals & Repair Service
- Draperies & Floor Coverings
- We have served Texas on above for 36 years

Murray-Baker-Frederic, Inc.[3], New Orleans, La.

Oklahoma Seating Co.[1], 19 W. Main St., Oklahoma City 2, Okla.

H. C. Parker, Inc., 336 Camp St., New Orleans, La.

Parkin Printing & Stationery Co., 213-215 Main St., Little Rock, Ark.

Practical Drawing Co.[1], 2205 S. Lamar St., Dallas, Texas

Refinery Supply Co.[3], 621 E. 4th St., Tulsa, Okla.

Rent-A-Movie Corp.[2], 718 Louisiana St., Little Rock, Ark.

Rowley Co., Inc.[1], 619 Baronne St., New Orleans 12, La.

E. H. Sargent & Co.[3], 5915 Peeler St., Dallas 9, Texas
- Laboratory Instruments, Apparatus and Chemicals

School Products Co.[1], Box 5293 Charles Ave., New Orleans 15, La.

Donald L. Smith Co.[2], P. O. Box 1736, 1110 Main Ave., San Antonio 6, Texas

W. G. Smith Co.[1], 100 W. 12th St., Houston 8, Texas
- Leonard Peterson Laboratory furniture
- Home economics furniture
- Library furniture
- Auditorium seating
- Draper Darkening Shades
- Leavitt Corporation, Telescoping bleachers
- Knockdown Bleachers
- Steel Grandstands
- Add-A-Seat Stadium
- Lockers
- Claridge Product Chalkboards
- Bulletin Boards
- Aluminum trim
- Natural Slate Blackboards
- Playground Equipment
- Everwear Basket Ball Backstops

Sound Film Associates[2], 1503 Jefferson, Houston 3, Texas

Sound Photo Equipment Co.[2], 1012 Main St., Lubbock, Texas

Southern Seating Co., 614 Gravier St., New Orleans, La.

Stanley Projection Co., 211½ Murray St., Alexandria, La.
- Distributors for Eastman Kodak
  - Victor Animatograph Corp.
  - Standard 500 Filmstrip Projectors
  - Coronet Instructional Films
  - Popular Science Publishing Co.
  - Jam Handy Organization
  - Complete audio-visual service

Charles G. Stidham Co.[2], 1001 Frost Bank Bldg., San Antonio 5, Texas

Texas Educational Aids[2], 120 East Elm, Tyler, Texas

Thompson Book and Supply Co.[1], 926 E. Main St., Ada, Okla.

Vaseco, Inc.[2], 2301 Classen Blvd., Oklahoma City 6, Okla.

Visual Aids, Inc.[2], 3524 W. 10th St., Little Rock, Ark.

Visual Education, Inc.[2], 12th and Lamar, Austin 2, Texas

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[1] Member National School Service Institute; [2] Member National Audio-Visual Association; [3] Laboratory Supply Distributor.



Ernest Braun

Public school construction in 1953 totaled 6,428 new buildings and additions, an all-time high. Among the many new schools is the Burlingame Intermediate School, Burlingame, San Mateo County, California. Hertzka and Knowles, San Francisco, architects.

EDUCATIONAL BUILDING IN 1953

by THE EDITORS

AMERICAN SCHOOL AND UNIVERSITY

EDUCATIONAL building in 1953 continued at the high levels characteristic of the last several years. To secure information on the character and amount of educational building during that period, AMERICAN SCHOOL AND UNIVERSITY has conducted its fifth annual study of all educational building in the United States. Data were secured by questionnaires sent to all public and private schools and to all junior colleges, colleges and universities throughout the nation. Information was projected on the basis of replies from approximately 13,000 mailings.

The data thus compiled revealed that the total cost of educational building in 1953 exceeded two billion dollars. For 7,560 buildings, the nation spent $2.25 billions.

General Trends in Building

Total costs and number of buildings for 1953 indicated that the increased level of construction begun in the postwar years was continuing. Total costs for all types of construction in 1953 were almost 150 million dollars greater than the preceding year. The volume of construction was higher than any previous period. Additions to existing structures represented a considerable proportion of 1953 educational building, constituting almost one-half of the total volume. Thirty-four percent of all school systems had some construction during the year.

Public school construction in 1953 exceeded all preceding years of the study, and private schools showed an increase over the previous year. On the other hand, junior college and college construction showed a decline. Elementary schools continued to be the leading type of building—54 percent of all new construction was for public elementary schools. During 1953 the Southern and Central states constructed 65 percent of all new buildings.

Public Elementary and Secondary Schools

As had been predicted frequently throughout the year, public school construction was at an all-time high during 1953. Both in volume and in cost, the figures

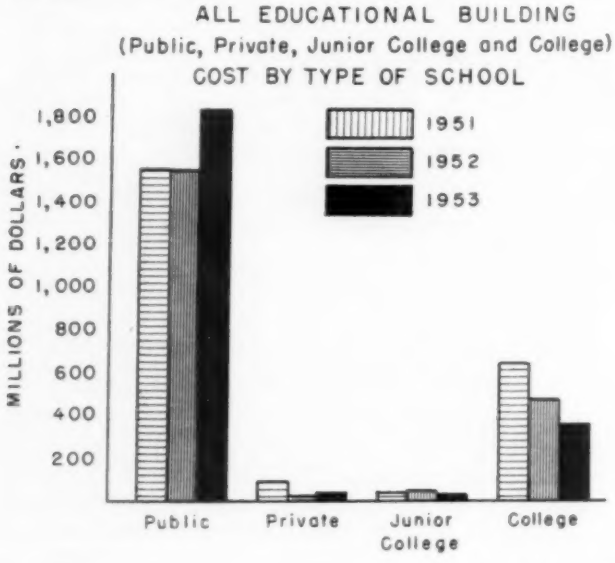
for public school building were higher than any previous year of the survey. Thirty-five percent of all public school systems reported some construction. It is noticeable that the amount of money spent on public elementary and secondary schools has increased each year since 1949. Elementary schools continue to account for over half of all public school construction.

During 1953 a total of 6,428 public school buildings were constructed. Of these, 3,261–51 percent–were additions to existing structures; 4,100 or 64 percent were elementary buildings. There were 1,598 secondary buildings, 25 percent of the total; and 11 percent, or 730, were combination buildings (housing a combination of elementary and secondary classes). The volume of public school construction represented a considerable increase over previous years; this increase was reflected in an increase in each of the three types of buildings.

The total cost of 1953 public school construction was 1.83 billions of dollars. For elementary construction, 957 million dollars were spent; for secondary schools, 681 millions; and for combination schools, 192 millions. Additions accounted for 523 million dollars or 29 percent of the total costs. The greater cost of secondary schools was indicated by the fact that 37 percent of the total costs but only 25 percent of the total volume were for secondary schools. Elementary schools

All Educational Building
(Public, Private, Junior College and College)
1951-52-53
Number of Buildings by Regions

Region	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
South	1927	30	1670	29	2543	33
New England	522	8	413	7	391	5
Central	1931	30	1667	29	2391	32
Middle Atlantic	948	15	778	13	726	10
Western	1112	17	1318	22	1509	20
TOTAL	6440	100	5846	100	7560	100



Public School Building
1951-52-53
Number of Buildings by Regions

Region	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
South	1412	30	1270	28	2154	33
New England	377	8	293	6	303	5
Central	1459	31	1408	31	2053	32
Middle Atlantic	612	13	536	11	614	10
Western	847	18	1084	24	1304	20
TOTAL	4707	100	4591	100	6428	100

Public School Building
1951-52-53
Number of Buildings by Type of School

Type of School	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
Elementary	3012	64	3034	67	4100	64
Secondary	1271	27	1271	27	1598	25
Combination	424	9	286	6	730	11
TOTAL	4707	100	4591	100	6428	100

All Educational Building
(Public, Private, Junior College and College)
1951-52-53
Cost of Buildings by Regions

Region	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$ 433,765,176	19	$ 374,720,817	18	$507,879,029	23
New England	213,306,675	9	187,053,705	9	154,215,434	7
Central	732,990,914	32	642,699,490	31	706,310,416	31
Middle Atlantic	569,471,658	24	518,774,178	24	428,322,985	19
Western	377,993,943	16	381,052,742	18	453,662,387	20
TOTAL	$2,327,528,366	100	$2,104,300,932	100	$2,250,390,251	100

Public School Building
1951-52-53
Cost of Buildings by Regions

Region	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$ 262,943,354	17	$ 247,493,753	16	$ 390,058,424	21
New England	139,205,305	9	139,215,236	9	129,634,563	7
Central	479,484,940	31	494,987,507	32	535,241,718	29
Middle Atlantic	386,681,404	25	386,708,990	25	379,082,610	21
Western	278,410,610	18	278,430,472	18	396,283,940	22
TOTAL	$1,546,725,613	100	$1,546,835,958	100	$1,830,301,255	100

Public School Building
1951-52-53
Cost by Type of School

Level of School	1951		1952		1953	
	Cost	Percent	Cost	Percent	Cost	Percent
Elementary	$ 788,300,626	51	$ 829,246,725	54	$ 957,280,614	52
Secondary	634,157,501	41	652,001,337	42	681,236,297	37
Combination	124,267,486	8	65,587,896	4	191,784,344	11
TOTAL	$1,546,725,613	100	$1,546,835,958	100	$1,830,301,255	100

Number of Stories in Public Schools
1951-52-53

Number of Stories	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
One	3468	74	3392	74	5076	79
Two	1099	23	1013	22	1195	19
Three or More	140	3	186	4	157	2

received 52 percent of the total cost for 64 percent of the total volume.

Construction figures for combination schools were 11 percent of costs and volume. The comparison of figures for cost and volume for the three types of schools is similar to trends apparent in previous years. In 1953 construction costs for public schools were almost 300 million dollars more than the previous year.

All sections of the nation reported public school construction. In number of buildings constructed the South led the nation with 33 percent of the total. This number was only slightly greater than that for the Central states which had 32 percent of the total volume, and which spent 29 percent of the nation's total cost for new public school construction.

Private Schools

Private school construction in the United States continued to increase. Total construction for 1953 was exceeded only by the peak year of 1951. One-hundred-and-twenty-two private school systems completed some construction during the year with a total of 185 buildings. Of this number, there were 74 elementary schools, 100 secondary schools and 11 combination schools.

The cost for private school construction in 1953 was 31 millions of dollars; thus expenditures for private

Private School Building
1951-52-53
Cost of Buildings by Regions

Region	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$13,414,262	15	$ 4,289,133	17	$ 4,091,668	13
New England	8,942,841	10	6,307,548	25	6,609,616	21
Central	27,722,808	31	2,270,717	9	13.848,720	44
Middle Atlantic	30,405,662	34	10,092,078	40	5,980,129	19
Western	8,942,841	10	2,270,717	9	944,231	3
TOTAL	$89,428,414	100	$25,230,193	100	$31,474,364	100

school construction were 14 percent of total national costs for educational building. By types of schools the approximate costs were seven million dollars for elementary schools, 19.5 millions for secondary, and five millions for combination. Secondary school costs were 62 percent of the private school total.

Private School Building
1951-52-53
Number of Buildings by Regions

Region	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
South	64	19	40	24	35	19
New England	47	14	35	21	26	14
Central	74	22	10	6	72	39
Middle Atlantic	114	34	51	31	28	15
Western	37	11	30	18	24	13
TOTAL	336	100	166	100	185	100

Both in volume and in cost, the Central states led the nation in the construction of private school buildings. Additions accounted for almost half of the 185 buildings erected.

Junior Colleges

Junior college construction showed a definite decline during 1953. Only 107 junior colleges reported 158 buildings completed during the year. The cost of these buildings was 28 million dollars. Twenty-six buildings, or 16 percent, were additions at a cost of 854 thousand dollars. The largest number of new junior college buildings were dormitories.

Junior College Building
1951-52-53
Number of Buildings by Regions

Region	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
South	92	46	92	41	76	48
New England	2	1	16	7	1	1
Central	27	14	24	11	27	17
Middle Atlantic	18	9	18	8	19	12
Western	60	30	74	33	35	22
TOTAL	199	100	224	100	158	100

Junior College Building
1951-52-53
Number of Buildings by Type

Type of Building	1951		1952		1953	
	No.	Percent	No.	Percent	No.	Percent
Administration	12	6	12	5	9	6
Agriculture	18	9	—	—	4	3
Dormitory	39	20	17	8	55	35
Education and Liberal Arts	34	17	29	13	8	5
Library	16	8	14	6	13	8
Science and Engineering	20	10	29	13	6	4
Service Facilities	18	9	46	21	16	10
Stadium and Gymnasium	22	11	41	18	11	7
Student Center	14	7	5	2	13	8
Vocational-Commercial	—	—	13	6	5	3
Home Economics	—	—	—	—	4	3
Multi-purpose and Misc.	6	3	18	8	14	8
ALL TYPES	199	100	224	100	158	100

Senior Colleges and Universities

In 1953, 559 colleges constructed a total of 789 buildings at a cost of nearly 361 million dollars. This amount was 76 buildings less than in 1952. The number of college buildings constructed has steadily declined each year of this study. Eighteen percent of all college buildings were additions; these additions represented 7 percent of the total cost. The South and the Central regions, together, accounted for approximately 70 percent of all college and university buildings. Dormitories, multi-purpose and administration buildings, respectively, led in the types of buildings constructed.

Number of Stories—Public Schools

The single-story school continued to be the dominant building type in public school construction. One-story buildings comprised 79 percent of all public school building.

Junior College Building
1951-52-53
Cost of Buildings by Regions

Region	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$15,031,415	34	$12,574,305	24	$ 5,936,635	21
New England	442,100	1	3,143,583	6	11,000	1
Central	5,747,306	13	6,287,167	12	12,735,201	45
Middle Atlantic	3,536,804	8	6,811,097	13	4,805,335	17
Western	19,452,420	44	23,576,878	45	4,525,209	16
TOTAL	$44,210,045	100	$52,393,060	100	$28,013,380	100

Junior College Building
1951-52-53
Cost of Buildings by Type

Type of Building	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
Administration	$ 4,421,005	10	$12,166,395	23	$ 2,110,233	8
Agriculture	2,210,502	5	———	—	326,335	1
Dormitory and Residence	7,515,708	17	4,093,368	8	6,997,781	24
Education and Liberal Arts	7,957,808	18	7,061,650	13	531,500	2
Home Economics	———	—	———	—	208,000	1
Library	3,536,804	8	2,419,091	5	6,621,124	24
Physical Education	10,610,411	24	4,385,485	9	2,392,809	9
Science	3,536,804	8	9,129,629	17	460,000	2
Engineering	———	—	———	—	1,800,000	6
Service Facilities	1,326,301	3	2,243,086	4	1,357,263	5
Student Center	2,210,502	5	391,701	1	1,716,088	6
Vocational — Commercial	———	—	2,779,058	5	687,014	2
Multi-purpose and Miscellaneous	884,200	2	7,723,597	15	2,805,233	10
TOTAL	$44,210,045	100	$52,393,060	100	$28,013,380	100

College Building
1951-52-53
Cost of Buildings by Region

Region	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$142,376,145	22	$110,363,596	23	$107,792,302	30
New England	64,716,429	10	38,387,338	8	17,960,255	5
Central	220,035,860	34	139,154,099	29	144,484,777	40
Middle Atlantic	148,847,788	23	115,162,013	24	38,454,911	11
Western	71,188,072	11	76,774,675	16	51,909,007	14
TOTAL	$647,164,294	100	$479,841,721	100	$360,601,252	100

College Building
1951-52-53
Cost of Buildings by Type

Type of Building	1951		1952		1953	
	Amount	Percent	Amount	Percent	Amount	Percent
Administration	$ 32,358,215	5	$ 43,185,755	9	$ 41,969,802	12
Agriculture	25,886,572	4	23,992,086	5	3,445,210	1
Dormitory	135,904,502	21	81,573,093	17	60,479,635	17
Education — Liberal Arts	77,659,715	12	71,976,258	15	21,410,529	6
Law	6,471,643	1	4,798,417	1	———	—
Library	51,773,144	8	38,387,338	8	37,888,762	11
Medical	45,301,501	7	38,387,338	8	4,939,743	1
Science	103,546,287	16	71,976,258	15	40,023,637	11
Engineering	19,414,928	3	4,798,417	1	10,404,177	3
Service Facilities	25,886,572	4	19,193,669	4	8,708,798	2
Stadium — Gymnasium	64,716,429	10	28,790,503	6	32,774,841	9
Student Center	45,301,501	7	33,588,920	7	24,576,477	7
Multi-purpose and Miscellaneous	12,943,285	2	4,798,417	1	66,688,548	18
Business and Industry	———	—	14,395,252	3	7,291,093	2
ALL TYPES	$647,164,294	100	$479,841,721	100	$360,601,252	100

College Building 1951-52-53 Number of Buildings by Regions

Region	1951		1952		1953	
	Number	Percent	Number	Percent	Number	Percent
South	359	30	268	31	278	35
New England	96	8	69	8	61	8
Central	371	31	225	26	239	30
Middle Atlantic	204	17	173	20	65	8
Western	168	14	136	15	146	19
TOTAL	1198	100	865	100	789	100

College Building 1951-52-53 Number of Buildings by Type

Type of Building	1951		1952		1953	
	No.	Percent	No.	Percent	No.	Percent
Administration	60	5	78	9	88	11
Agriculture	72	6	43	5	20	3
Dormitory	264	22	182	21	175	21
Education and Liberal Arts	168	14	112	13	69	9
Law	11	1	9	1	—	—
Library	84	7	61	7	58	7
Medical	24	2	8	1	5	1
Science	144	12	121	14	74	9
Engineering	48	4	9	1	21	3
Service Facilities	132	11	69	8	47	6
Stadium and Gymnasium	120	10	69	8	60	8
Student Center	60	6	43	5	63	8
Business and Industry	—	—	26	3	19	3
Multi-Purpose and Misc.	11	1	35	4	90	11
ALL TYPES	1198	100	865	100	789	100

Classrooms and Other Spaces

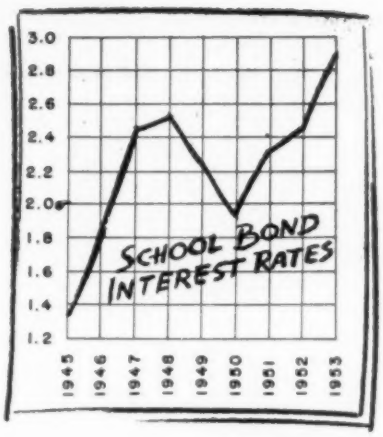
Educational buildings constructed in 1953 contained 42,110 classrooms and 26,566 other spaces. Ninety percent of the classrooms were in public schools.

School Building Costs

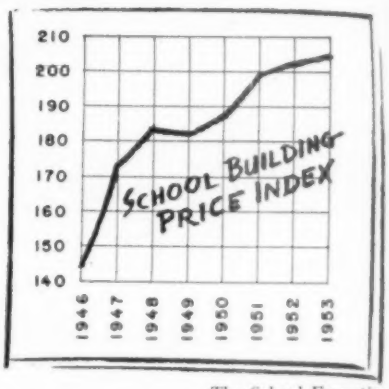
In contrast to previous years school building costs remained relatively stable during 1953. The index of school building costs in January was 204 (1939 index was 100). At the end of the year the index was still approximately 204.

The prices of school building materials generally declined during the year, while some materials, such as metal products, were exceptions to this general trend. The cost of labor continued to rise.

In comparison with the last few years school bond interest rates during 1953 were high. July interest rates exceeded 3 percent for the first time in recent years. However, compared with rates over the past thirty years, 1953 rates were toward the lower end of the scale. The volume of school bonds sold during 1953 set an all-time high.



School bond interest rates have been on the increase since 1950.



School building price index for the years 1946 through 1953.

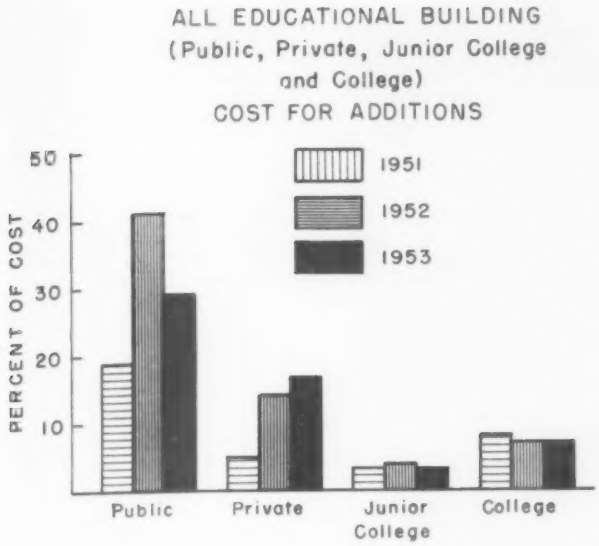
The School Executive

Design Features

As the volume of educational building increases, changes and innovations in design well might be expected. In 1953 such changes were apparent, for the most part, only in elementary schools. College buildings and, with minor exceptions, secondary schools continued to follow established designs. Such a situation is directly comparable to what many people feel has been the pattern of educational programs in each of the three respective types of schools.

Although 1953 was mainly a year in which the search continued for more adequate solutions to design problems, some distinctive features were apparent in the buildings constructed.

A major problem in educational building has been the large and costly circulation areas which serve no educational purpose. To avoid this problem there was an increasing use of outside corridors. Circulation space was also used in some instances as part of basic classroom areas. In some schools circulation spaces were designed to serve related educational purposes. Seats and benches were placed in corridors so that pupils might use them for social purposes. Lobbies were designed as meeting places and for a wide variety of other purposes.



The trend toward the single-story building, especially in public schools, has been very apparent in recent years. Related to this feature but not exclusively confined to the single-story building were some approaches made in 1953 toward handling of elements of educational buildings. The bases of such grouping and separation of elements varied widely; for instance, in some schools on the basis of age groups and in others on the basis of activities. Nevertheless, some interesting relationships of spaces were achieved. The results were known by such names as the finger plan, the cluster plan, the zone plan, the loft plan and the core plan.

The Campus Plan

Perhaps the most significant feature of this type to appear was the campus plan used in secondary schools. The campus-type school is not new in educational building, having been used widely in colleges and private schools for many years. It was the basis of design of some public schools already in operation by 1953. Of especial note was its use in public high schools as a means of reducing large schools to a more personal scale and, at the same time, of achieving greater flexibility in the use of space. It will be interesting to observe the reception given this idea in current and future plants on the secondary level.

Some particular attention was given to the design of multi-use spaces during the past year. This included the selection of a more efficient combination of activities to be housed together, better location of such spaces in the over-all plan and better handling of detailing within these spaces. To provide for greater utility, not only of multi-purpose rooms but also for other educational spaces, greater provisions for storage were made in educational buildings in 1953.

Use by Community Groups

Attention also was given to the use of school buildings by community groups. No apparent basic conflict was created in designing a school for use by community groups as well as by the regular day school. The same facilities seemed adequate for use by both with the provision of such design features as zoned heating and lighting controls, appropriately located entrances, drives, sanitary facilities and storage spaces.

Attempts were made in 1953 to provide more adequate technical facilities in educational buildings. The use of top lighting increased. Scientific efforts to use natural ventilation and to secure effective sun control were apparent. The variety of solutions proposed for technical problems and the tentative efforts to gear technical facilities to educational programs indicated the rising concern in this area.

A pleasing feature of design in 1953 was the use of interior courts in educational buildings. Many build-

North Hill Elementary School, Cheektowaga, New York, is of one-story construction. Foit and Baschnagel, Buffalo, New York, architects.





Individual carrels of the Youngstown College Library, Youngstown, Ohio. Kling and Frost are the architects. Seven percent of the college buildings constructed last year were library buildings.

Mears



Library areas were important elements of public school construction also. This is the O. Henry Junior High School library, Austin, Texas. Fehr and Granger, architects.

ings contained interior courts; some did so in a manner which provided a valuable addition to the physical facilities available for educational purposes.

Classrooms

In 1953 some buildings contained classrooms which showed an increased sensitivity to relating indoor instructional areas and outdoor environment. This was accomplished through the use of indoor courts, by the use of glass areas which established continuity with the surrounding terrain, by classroom doors which opened directly onto outside instructional courts and by the establishment of regular outdoor classrooms.

The self-contained classroom was used in some schools to avoid the necessity for additional specialized spaces, particularly in elementary schools. For this purpose classrooms contained such features as movable furniture; folding partitions; and chalkboards, tacking panels and storage spaces as classroom partitions. Structural elements, too, were used to create different areas within the room. Rooms were designed in a variety of sizes and shapes with the square classroom much in evidence.

To achieve desired flexibility and to provide for future changes in educational programs some secondary schools contained classrooms of varying sizes as well as large areas divided into classrooms by partitions which could be efficiently and economically redesigned.

Despite these improvements in classroom design, however, one fact overshadowed the situation in 1953—the number of classrooms constructed was far from adequate to meet the needs of the nation.

Sites selected in 1953 indicated a trend toward



Increasing attention is being given to providing social living areas for students, such as the Lakewood High School Social Center, Lakewood, Ohio. Architects are Hays and Ruth of Cleveland, Ohio.

Spacious room in the Rosedale Elementary School, Chico, California, has ample tackboard area for the pupils' display of their handiwork. Architect is Lawrence G. Thomson of Chico.



larger sizes. Unusually large sites were being selected for some secondary schools, with a few sites containing from 50 to 100 acres.

Several factors accounted for the selection of larger sites. These included the use of single-story buildings, the trend toward greater separation of elements of school plants and the increased use of outdoor facilities in school programs.

Ample spaces for outdoor physical education and general play activities were being provided. Other site features were outdoor courts connected to classrooms, nature study areas, outdoor circulation of pupil traffic and off-street parking facilities.

School systems have cooperated with local government authorities and planning agencies in locating sites to avoid such obstacles as traffic hazards. Shifts in population within school districts reinforced the need for cooperation among all planning authorities.

Cooperative Planning

The design features mentioned above, together with others which appeared in 1953, partially resulted from individual creative efforts of educators and architects. However, some improvements were the result of increased participation by professional and lay personnel in the cooperative planning of school buildings. In many areas of the nation citizens advisory groups were an accepted aspect of planning procedures. Nevertheless, this basic planning idea was still to be understood and accepted by many persons responsible for the planning of educational buildings.

School Facilities Survey

In December, 1953, the United States Office of Education issued the third report of its School Facilities Survey. This report was the summary of a survey made of public elementary and secondary school plants in 43 states and territories. Since these 43 states and territories enroll almost 79 percent of the nation's public school population, it can be assumed that the report presents an accurate picture of the status of school plant facilities in the nation at that time.

In 1952, according to the report, "nationwide school plant needs included 312,000 instruction rooms to house 8,881,360 pupils at a cost of $10.6 billion."* Even if all the applicable resources available for public school capital outlay in the states and territories in 1952 ($5.9 billions) had been applied to this need, a nationwide deficit of $4.7 billions would have remained.

This status study of school facilities is to be followed by a long-range planning study. The Office of Education plans to publish a report on this second or long-range planning phase of the School Facilities Survey in the fall of 1954.

Outlook for the Future

The outlook for educational building is that the volume will continue at least at current high levels. If the inadequate nature and amounts of school housing are to be remedied, current rates of construction must be increased. Increased public interest in the schools indicates greater awareness of the problems.

Numerous factors have combined to present the nation with major educational building problems. Inadequate school construction between 1930 and 1950 created a serious backlog of needs. Recent increases in school construction have not been nearly adequate to meet the needs created by the increasing enrollments and rising birth rates. Predicted declines in postwar birth rates have not yet materialized. The National Education Association estimated that public school enrollments for 1953–1954 were over a million greater than the previous year alone. The U.S. Office of Education estimates that public school enrollments will have exceeded 36 million by 1959–1960.

The mobility of population also continues to affect school construction. Class sizes in many schools are too large for sound instructional practices. Increasing enrollments, teacher shortages and lack of school buildings are depriving many children of full educational opportunities. The National Education Association estimated that well over 600,000 children went to school on half-day or part-time sessions in 1953–1954.

Many factors, some of which cannot be reasonably predicted, will affect the quantity and quality of future educational building. Shortages of elementary school facilities have received major attention for the past several years. Now the problem is becoming acute at secondary levels. As the greatly increased enrollments continue to reach the high schools and colleges, an increase in the amounts of building for these levels can be expected.

* *Report of the Status Phase of the School Facilities Survey.* Washington: United States Government Printing Office, 1953. p. 114.



Eddowes Co.

This jury panel met for two days to examine the 139 school designs entered in the competition. From left: Donald Barthelme, J. Stanley Sharp, Lawrence B. Perkins, John S. Cartwright and Wilfred F. Clapp.

1953 COMPETITION FOR BETTER SCHOOL DESIGN

by GEORGETTE N. MANLA

Associate Editor, AMERICAN SCHOOL AND UNIVERSITY

THE THIRD of the national Competitions for Better School Design, sponsored by *The School Executive* magazine to stimulate a creative approach to school building design, has been a review of some of the best school architecture of 1953. The Competitions, having spanned three years of peak school construction, present a close-up view of the kinds of buildings architects are providing throughout the nation for elementary, secondary and college levels of education.

The Jury Panel Members

The 139 school designs judged in the 1953 Competition for Better School Design were submitted by 114 architectural firms from 33 states. Members of the jury panel judging these designs were: Lawrence B. Perkins, AIA, Perkins and Will, Architects-Engineers, Chicago, Illinois, Chairman; Donald Barthelme, AIA, Donald Barthelme and Associates, Houston, Texas; John S. Cartwright, Superintendent of Schools, Allentown, Pennsylvania; Wilfred F. Clapp, Assistant Superintendent in charge of School Organization and Plant, State Department of Education, Lansing, Michigan; and J. Stanley Sharp, AIA, Ketchum, Gina and Sharp, New York City. Kenneth Gibbons, AIA, of Gibbons and Heidtmann, New York City, served as professional adviser for the Competition.

An outstanding revelation in the 1953 Competition, the jury panel felt, was that the struggle between traditionalism and contemporary architecture is apparently over. Contemporary architecture has definitely won the battle against the stylistic peculiarities of traditionalism. Only among college buildings is this still an issue.

Features of Note

The five judges noted that the self-contained classroom is following from the elementary to the secondary school level, and that large general-use spaces are appearing more and more. They indicated, however, that despite self-contained classrooms, general-use spaces and expanded use of corridor areas, many school designs tended to limit the educational flexibility of the buildings.

They observed, particularly, that there was less creativity and progress in school design in those states which impose rigid building controls.

The jury designated top awards for five architectural firms for seven school designs. They selected ten firms for honorable mention for excellence of their designs, and ten firms for special mention for excellent design features.

Considering the 1953 Competition for Better School Design as a whole, it is believed that the 139 schools involved represent educational building now taking place all over the nation. A study of the various design features presented here may contribute immeasurably to the successful design solution of future educational buildings.



Joseph W. Molitor

Double Oaks Elementary School, Charlotte, North Carolina, is completely fire resistant. Architects are A. G. Odell, Jr., and Associates.

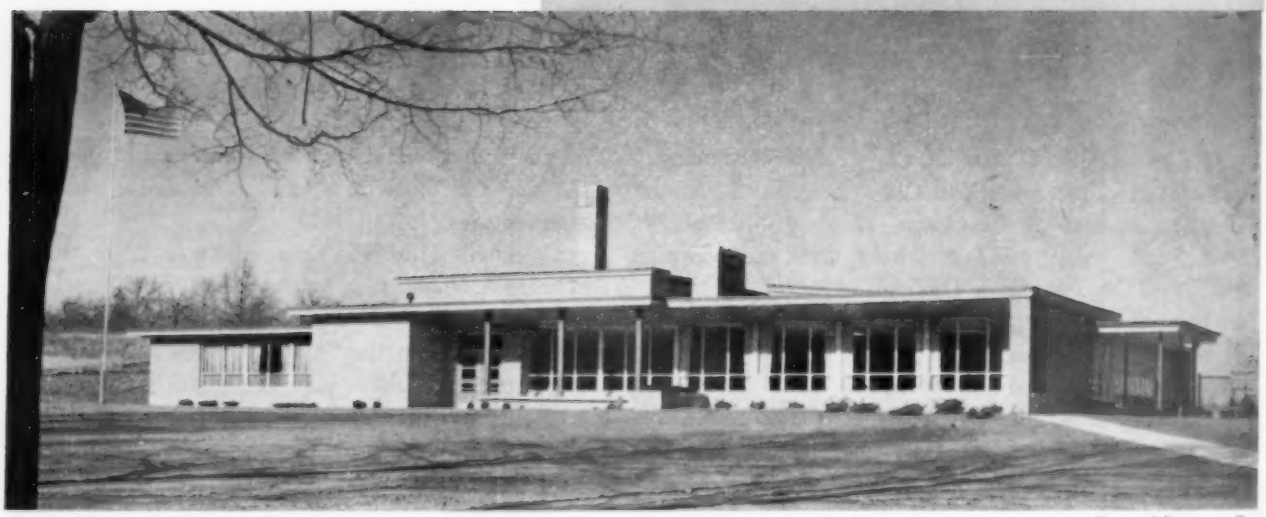
ELEMENTARY SCHOOL EXTERIORS

Erick Grade School, Erick, Oklahoma, was designed for a maximum enrollment of 270 pupils. Vahlberg, Palmer and Vahlberg, Oklahoma City, are the architects of the building.



A. Y. Owen

Samuel J. Gier Elementary School, Hillsdale, Michigan, has a required immediate capacity of 230 children. Architects are the Warren S. Holmes Company of Lansing.

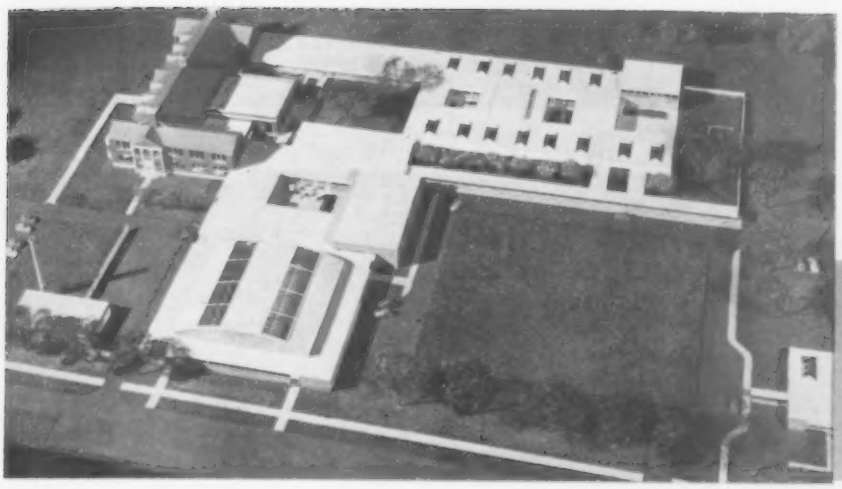


General Pictures Co.

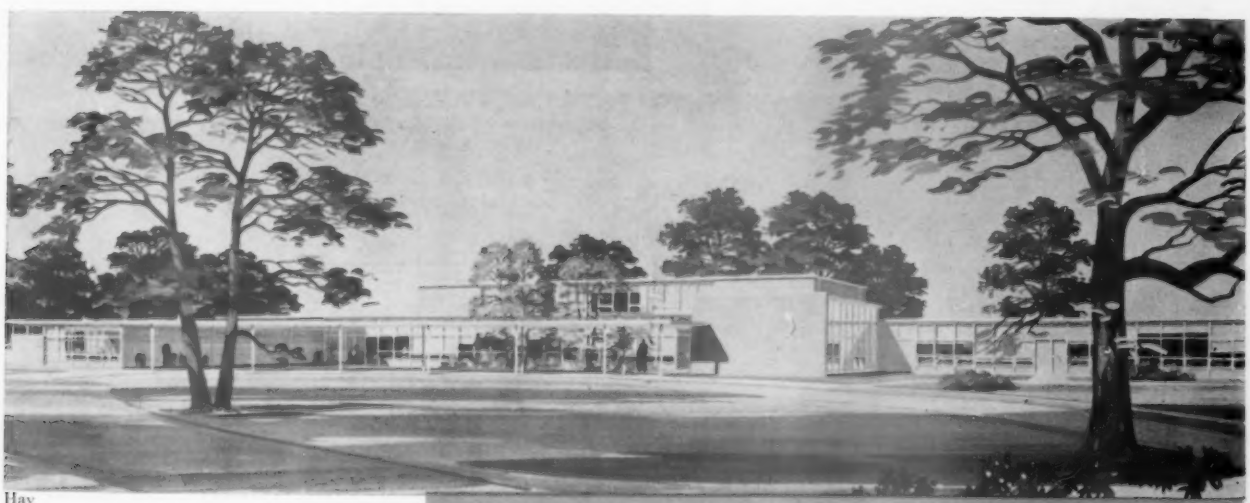
Visual keynote of the Bar Harbor Elementary School, Bar Harbor, Maine, is the thin arch roof of the multi-purpose room. Alonzo J. Harriman, Inc., are the architects-engineers.



Joseph W. Molitor



The Detroit University School and Grosse Pointe Country Day School, Grosse Pointe Woods, Michigan, is comprised of grades from nursery through 12th grade. Architects are Leinweber, Yamasaki and Hellmuth of Detroit.



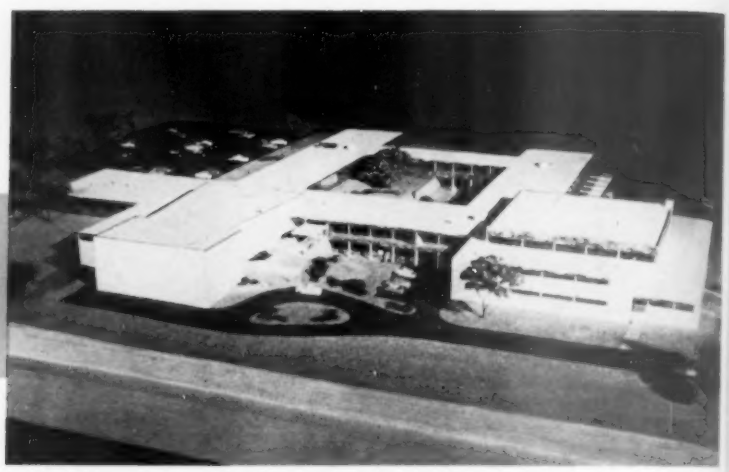
Hay

Capacity of the North Street Elementary School in Greenwich, Connecticut, is 600 pupils. Sherwood, Mills and Smith of Stamford are the building architects.



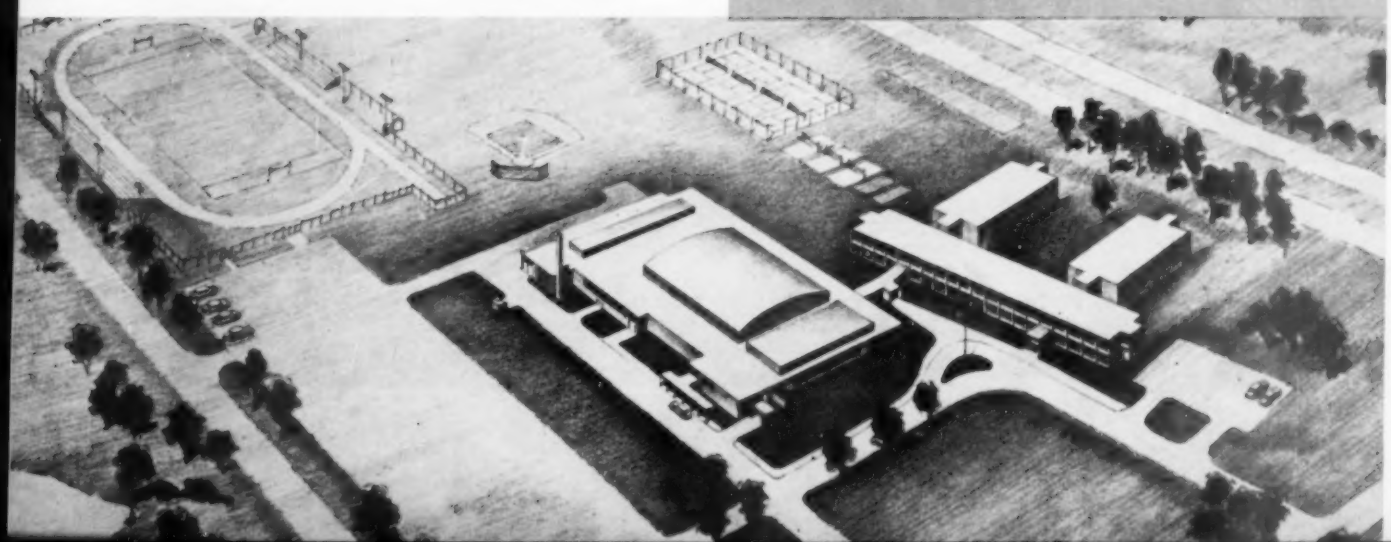
High School for Apple Creek, Wayne County, Ohio, was designed when three small country high schools voted to merge and build a single school for all their needs. Joseph Baker and Associates are the architects of the structure.

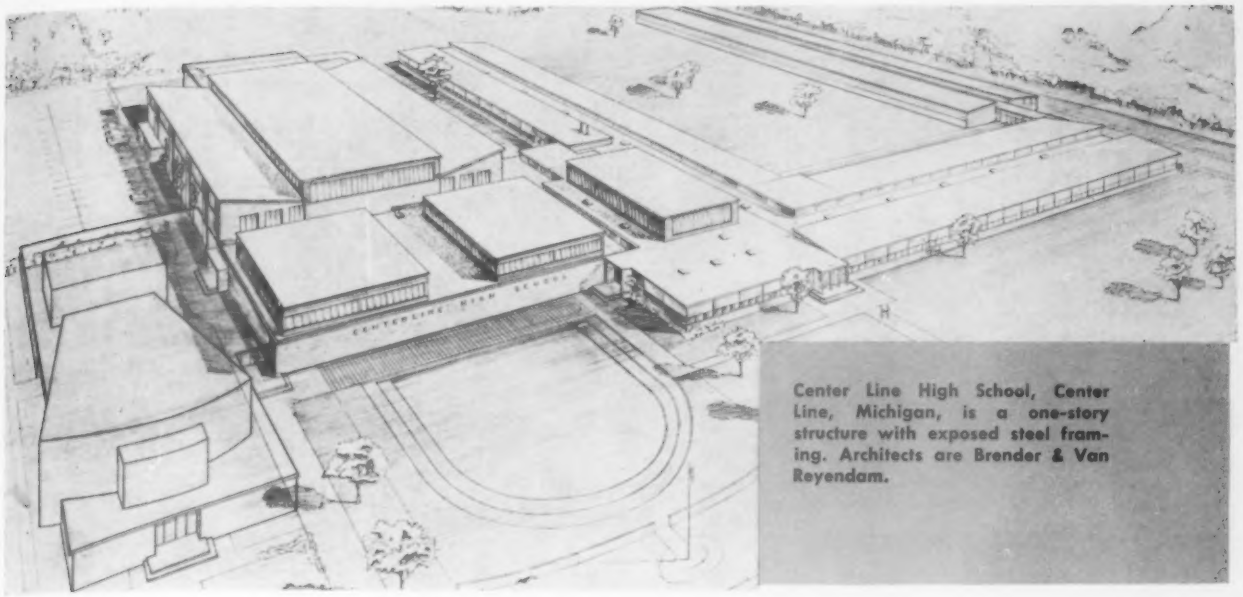
SECONDARY SCHOOL EXTERIORS



Springfield Senior High School, Flourtown, Pennsylvania, was designed by Howell Lewis Shay of Philadelphia.

Alexander Ramsey Junior-Senior High School, located in Ramsey County, Minnesota. Architects are Magney, Tusler and Setter.





Center Line High School, Center Line, Michigan, is a one-story structure with exposed steel framing. Architects are Brender & Van Reyendam.



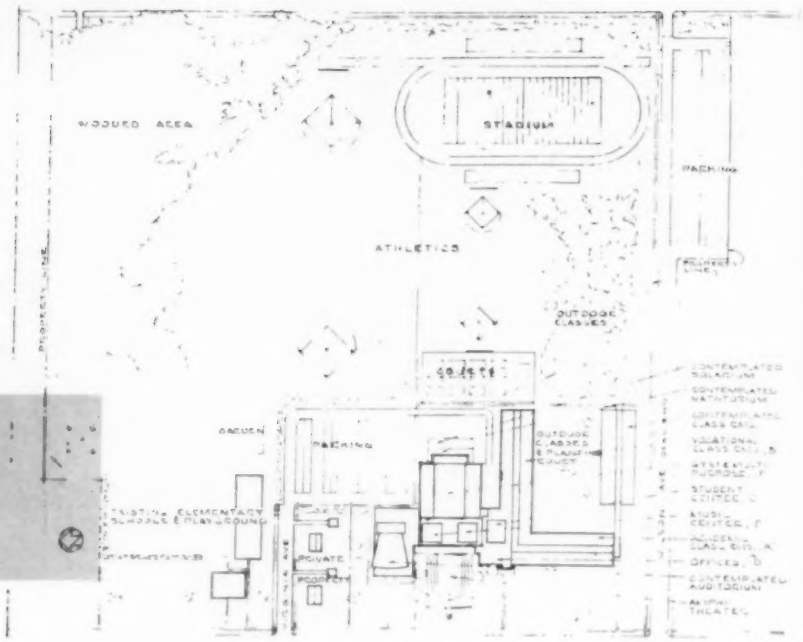
The Senior High School for Groton, Connecticut is located on a 65-acre site. Architect is Warren H. Ashley of West Hartford.



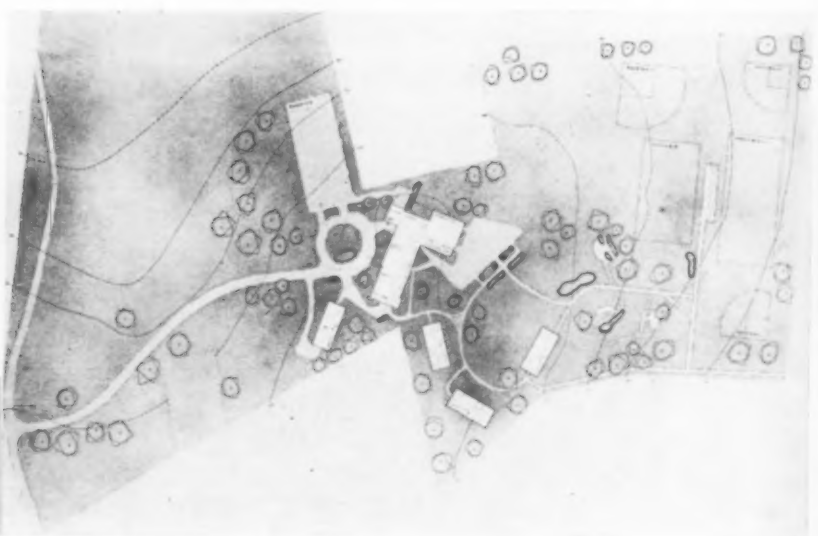
John W. Ligon Junior-Senior High School, Raleigh, North Carolina, was constructed at a cost of 1.18 million dollars. Architects are Cooper, Haskins & Rice.

Burnie Batchelor

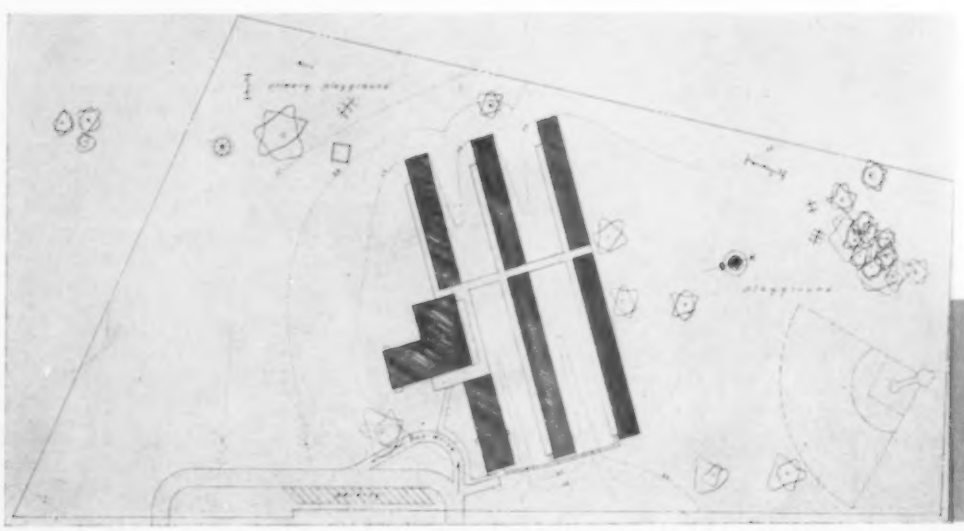
SITE PLOT PLANS



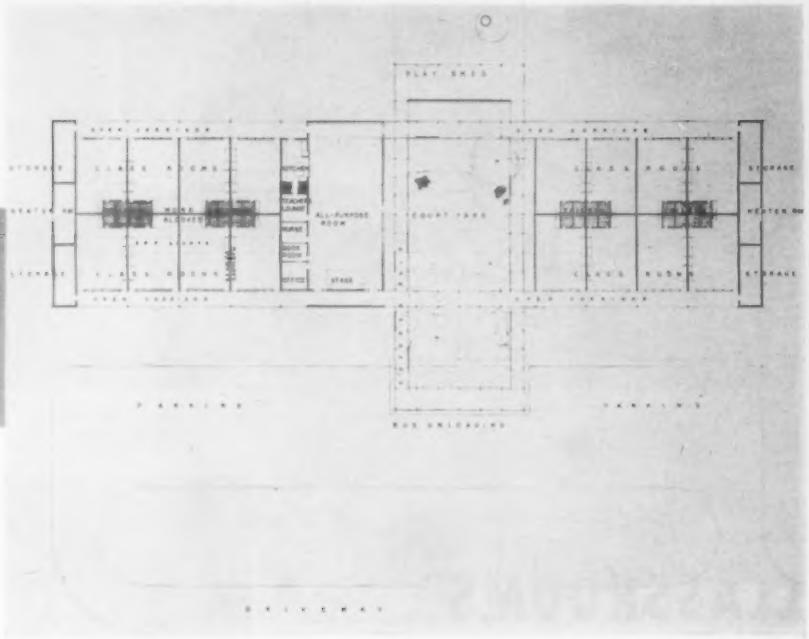
Site of the Center Line High School, Center Line, Michigan, consists of 50 acres of level land. Brender and Van Reyendam, architects.



The 65-acre site of Groton High School, Groton, Connecticut, is located on a high hill. Warren H. Ashley, architect.



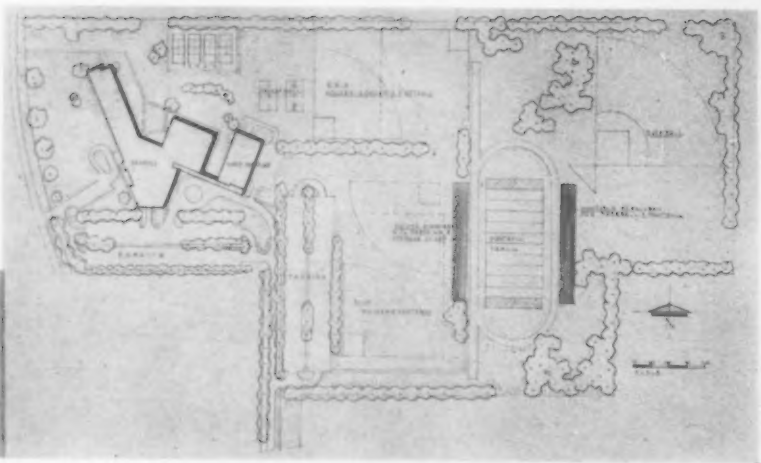
Juliette Low Elementary School, Savannah, Georgia, has a capacity of 660 students. Oscar M. Hansen of Savannah is the architect.



Irene McCormick Grade School, Farmington, New Mexico, has provisions for immediate future expansion to increase its number of classrooms from 8 to 16. Architects are Max Flatow and Jason Moore.



Des Peres, Missouri, Elementary School Addition is placed to the south of the existing building. Architects-engineers are William B. Ittner, Inc.



Adequate parking for all school and community functions is provided on site of the Canton Senior High School, Canton, Illinois. Atkins, Barrow and Associates, architects.



Roger Sturtevant

Classroom area of the Manor Elementary School, Fairfax, California, is 960 square feet. There is a doorway to the outdoors. John Lyon Reid, architect.

CLASSROOMS

Classrooms of the Double Oaks Elementary School in Charlotte, North Carolina, have clear glass panels in the upper walls. Work counters are located at the room's perimeter. A. G. Odell, Jr. and Associates are the architects.



Joseph W. Molitor

Ulric Meisel-Dallas



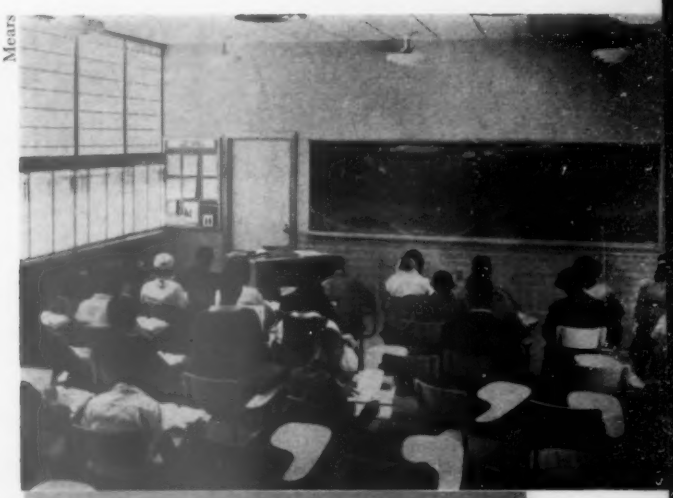
Large areas of glass eliminate any feeling of confinement in classrooms of the Sam Houston Elementary School, Port Arthur, Texas. Architects are Caudill, Rowlett, Scott, Neff and Associates.



Room interior of the Canton Union Senior High School, Canton, Illinois, features simplicity of line. The architects are Atkins, Barrow and Associates.



Classrooms on the lower level of the Foster A. Begg Intermediate School, Manhattan Beach, California, open to outside classrooms. Daniel, Mann, Johnson & Mendenhall are the architects.



Mears

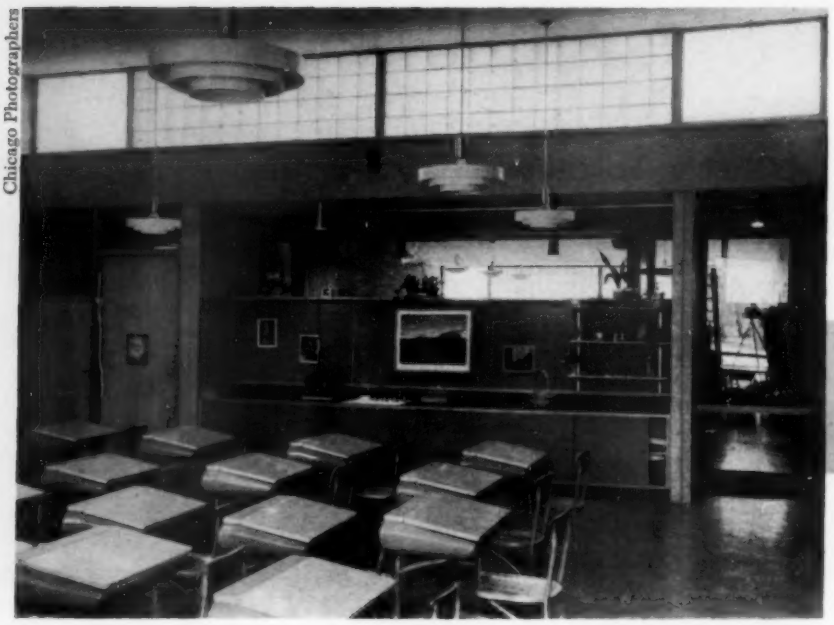
Classrooms are located away from noisy areas of the Anderson High School, Austin, Texas. The building was designed by Kuehne, Brooks and Barr, architects-engineers.



Ulric Meisel-Dallas

Rooms of the Mirabeau B. Lamar Junior High School, Laredo, Texas, are separated by teaching space dividers. There are skylight panels within the ceiling. School was designed by Caudill, Rowlett, Scott and Associates.

Chicago Photographers



Vertical vision strips flank glass blocks in classrooms of the Southwest School, Evergreen Park, Illinois. Bryant and Walchli, architects.

CLASSROOMS



Work alcove is located at rear of this classroom of the Lincoln Elementary School, Alexandria, Minnesota. Traynor and Hermansen, architects.

Roger Sturtevant



A work and storage band runs along one side of classroom of the Deer Park School, Fairfax, California, and into a sheltered outside alcove. John Lyon Reid, architect.

A seating platform in the kindergarten alcove aids youngsters in pulling on overshoes, etc., in the Lewis and Clark Elementary School, Great Falls, Montana. McIver, Hess and Haugsjaa, architects.



Carlton L. Lingwall

KINDERGARTENS



General Pictures

Kindergarten work bench in the Samuel J. Gier School, Hillsdale, Michigan. Warren S. Holmes Company are the architects.

Colorful mosaic tile provides a background for the drinking fountain in the kindergarten of the Lincoln School, Appleton, Wisconsin. Raymond N. Le Vee and Associates, architects.



Lens Art



Lighting is by fluorescent slim-line fixtures in kindergarten of the Edward Everett Elementary School, Detroit, Michigan. Architects are Giffels and Vallet, Inc., L. Rossetti.



Dispersed conference areas of the Roosevelt Park High School library, Fergus Falls, Minnesota, can be made private by use of folding doors. Architects of the school are Thorshov and Cerny, Inc., Minneapolis, Minnesota.

Oxley & Sons

LIBRARIES



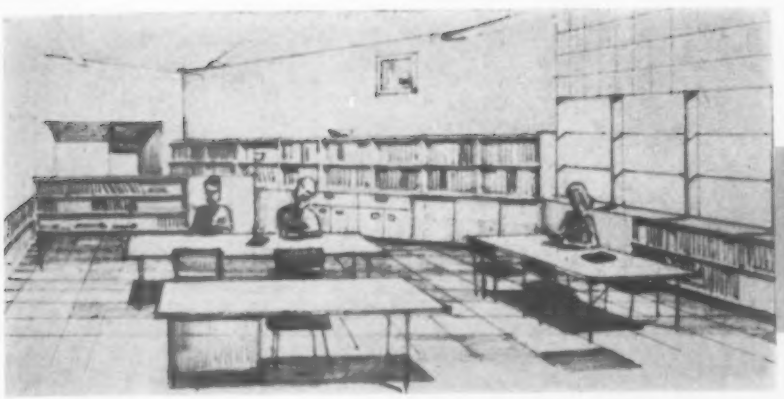
Library building of the Sanford Senior High School, Sanford, North Carolina, houses facilities for library use by 400 students. It comprises a unit of the campus plan for Sanford Senior High School, Page and Smith, architects.

Joseph W. Molitor



Joseph W. Molitor

Library of the Double Oaks Elementary School, Charlotte, North Carolina, is reached from the classroom area by means of an enclosed corridor. A. G. Odell, Jr., and Associates, architects.



Low book racks in the library of the North Hill Elementary School, Cheektowaga, New York, will permit easy selection of books by pupils. School was designed by Foit and Baschnagel, Buffalo, New York.

Ben Schnall



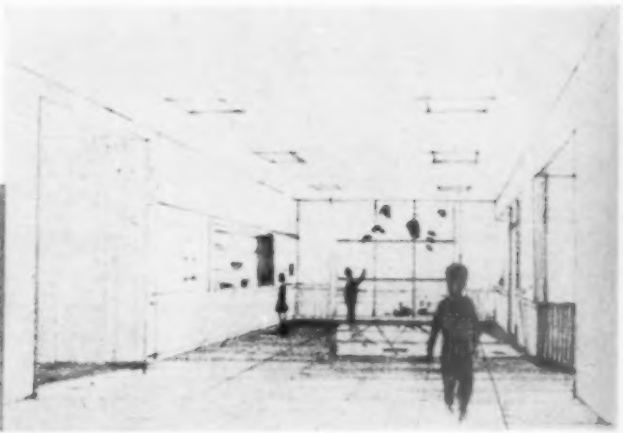
The Thomas Jefferson Junior High School library, Fair Lawn, New Jersey, contains library facilities for 750 students. Architect is Arthur Rigolo.



First floor lobby of the Roosevelt Park High School, Fergus Falls, Minnesota. Thorshov and Cerny, Inc., architects.

Oxley & Sons

FOYERS LOBBIES



Foyer of the North Hill Elementary School, Cheektowaga, New York, has terrazzo flooring with ceramic tile wainscot. Foit and Baschnagel, architects of the building.



Seminole Hills Elementary School lobby, Mount Clemens, Michigan. Building has a capacity of 275 pupils. Giffels and Vallet, Inc., L. Rossetti, architects.

Lens Art

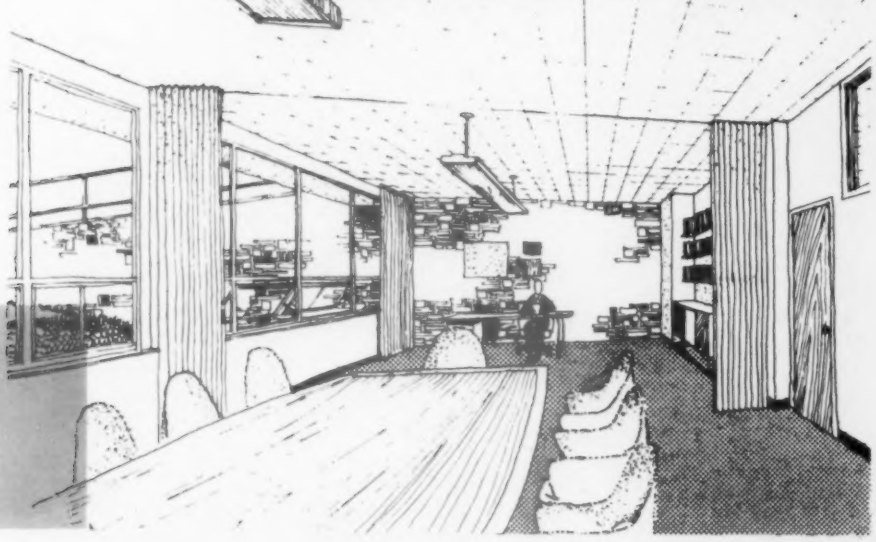


East Whittier School District Administration Office and Warehouse, Whittier, California, provides offices and conference rooms for the school district administrative staff as well as area for a supply warehouse. The site is centrally located within the East Whittier School District. R. L. Warren and William Henry Taylor, Pasadena, are the architects.



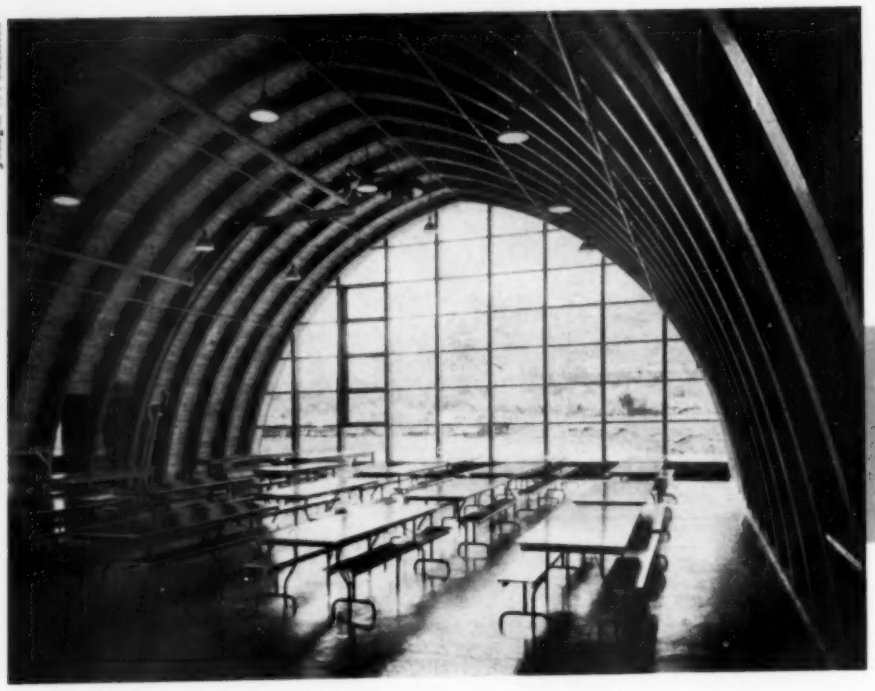


ADMINISTRATIVE UNITS



Administrative area within the Springfield High School, Springfield, Pennsylvania, includes a general office and a district office. Howell Lewis Shay, architects of the school.

Joseph W. Molitor



Laminated wood arches frame the multi-purpose room of the Bar Harbor Elementary School, Bar Harbor, Maine, which serves as a lunchroom. Alonzo J. Harriman, Inc., architects.

LUNCHROOMS

Dining and social room of the Roosevelt Park High School, Fergus Falls, Minnesota, permits easy handling of groups for entertainment and refreshment. Thorshov and Cerny, Inc., Minneapolis, are the architects.



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Serving counter is located at rear of cafeteria in the Thomas Jefferson Junior High School, Fair Lawn, New Jersey. Arthur Rigolo, architect.

Ben Schnall



Outdoor snack bar of the Arcadia High School, Arcadia, California. Austin, Field & Fry, Los Angeles, are the architects.

Douglas M. Simmonds



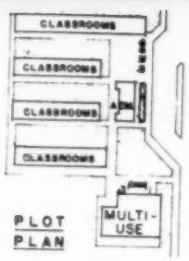
This lunchroom serves children of the Double Oaks Elementary School, Charlotte, North Carolina. A. G. Odell, Jr. and Associates, architects.

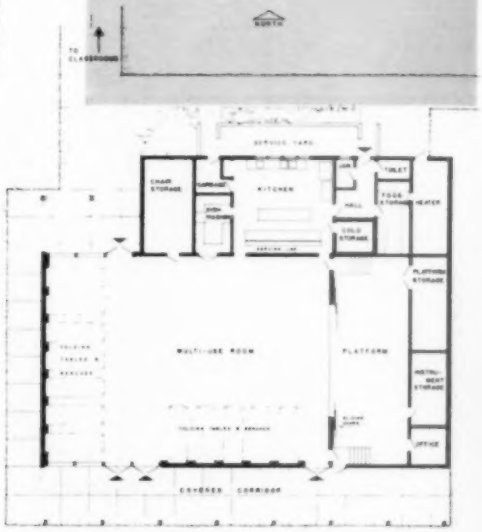
Joseph W. Molitor



Roger Sturtevant

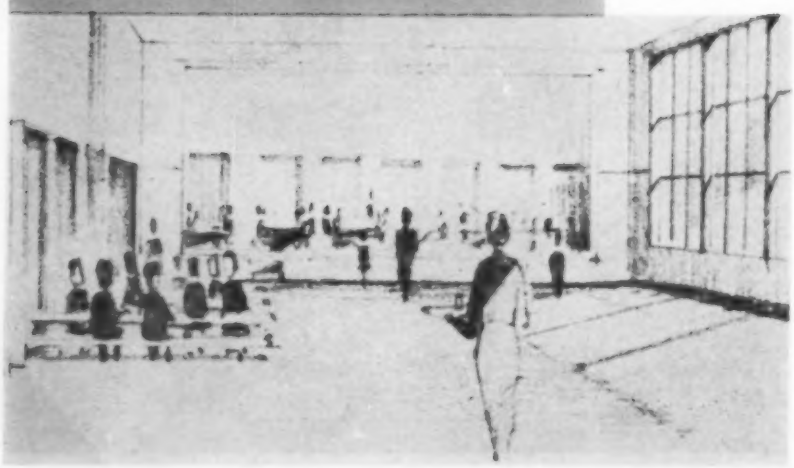
Multi-Use Wing of the Adelia Kimball Elementary School, Antioch, California, has provisions for cafeteria space and special education facilities not available at the present school. Maximum student capacity is 650. Architects are Wurster, Bernardi and Emmons of San Francisco.





MULTI-PURPOSE UNITS

Multi-purpose play-assembly-lunch room of the North Hill Elementary School, Cheektowaga, New York. Stage is at the rear. Feit and Baschnagel, architects.

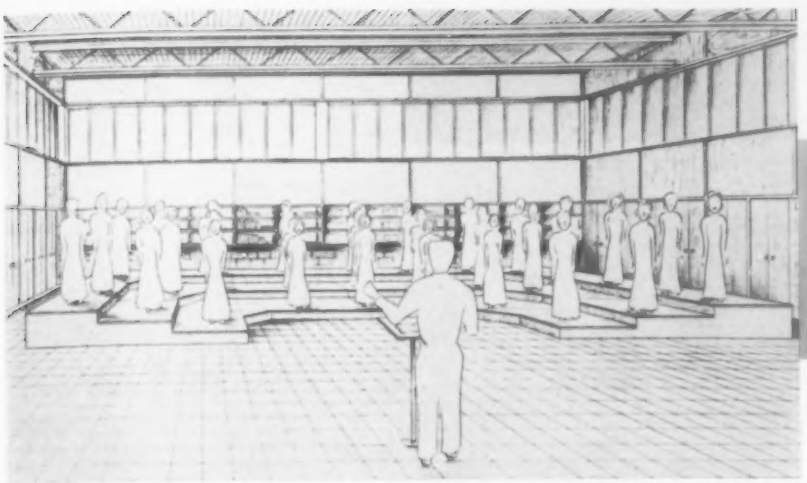


ARTS AND CRAFTS



Music room of the Chico Junior High School, Chico, California. L. G. Thomson, architect.

Wright's



One of two areas for musical activity provided within the Center Line High School, Center Line, Michigan. This room is for voice, not shown is an area for instrumental music. Architects are Brender and Van Reyendam.



Shop area of the Chico Junior High School, Chico, California, is adjacent to the service road. School is designed by L. G. Thomson.

Wright's

Oxley & Sons



Area for wood crafts in the Roosevelt Park High School, Fergus Falls, Minnesota, is located in the shop wing of the building designed by Thershov and Cerny, Inc.



Douglas M. Simmonds

Foods area of the Arcadia High School, Arcadia, California, homemaking suite is separated from the clothing area by a draw curtain shown at left. Architects are Austin, Field & Fry.

Wright's

HOMEMAKING LABORATORIES





Homemaking foods unit, above, and sewing unit, left, of the Chico Junior High School, Chico, California. Building is designed by L. G. Thomson.



Homemaking area of the Foster A. Begg Intermediate School, Manhattan Beach, California, includes every facility found in the average 5-room home in Southern California. Daniel, Mann, Johnson and Mendenhall are the architects.

Gliessman

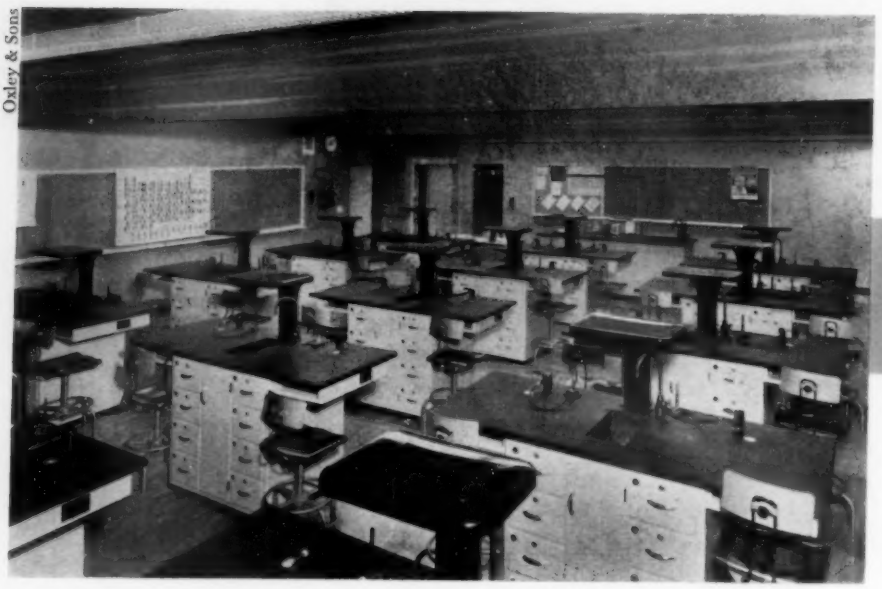


Kitchen equipment and work areas of the Canton Senior High School home economics unit, Canton, Illinois. Cabinets suspended along window side, rear left, provide additional storage space. Atkins, Barrow and Associates, architects.



Home economics room of the Roosevelt Park High School, Fergus Falls, Minnesota. Architects are Thorshov and Cerny, Inc.

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Large chemistry laboratory of the Roosevelt Park High School, Fergus Falls, Minnesota. Thorshov and Cerny, Inc., architects.

SCIENCE

Sinks and work counters are located at the rear of the science room in the Chico Junior High School, Chico, California. L. G. Thomson of Chico is the architect.



Wright's



Sole science laboratory of the Pearland High School Classroom Building, Pearland, Texas, has a capacity of 30 pupils. Architect is Stayton Nunn of Houston, Texas.

F. W. Seiders



Corridors serve as work rooms in the Vandercook Lake Elementary School, Jackson County, Michigan. Planting boxes add to the attractiveness of the area. Carl C. Kressbach of Jackson is the architect.

General

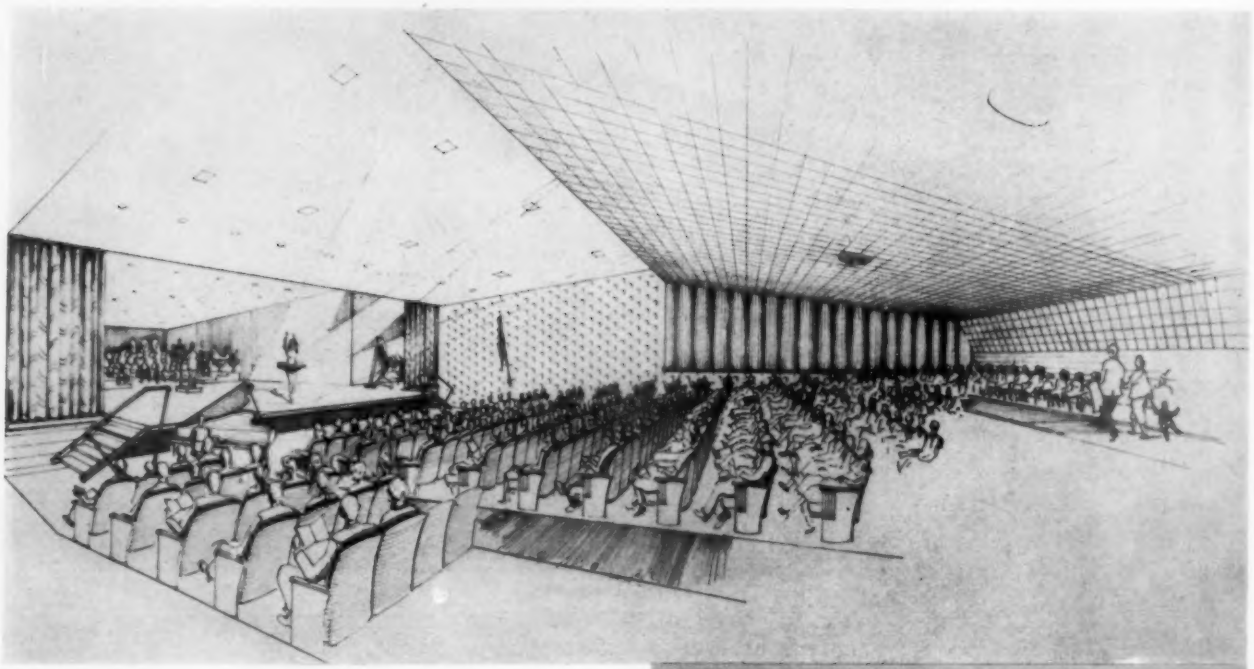


Classroom work alcove of the Samuel J. Gier Elementary School, Hillsdale, Michigan, contains ample working surfaces, storage facilities and a sink. Warren S. Holmes Company, architects.

PROJECT-WORK CORNERS



This kindergarten project corner is located in the Elm Park Elementary School, Webster City, Iowa. Architects of the building are Smith, Voorhees, Jensen, Silletto and Associates, Des Moines, Iowa.



AUDITORIUMS

Auditorium for the High School at Apple Creek, Wayne County, Ohio, features a deep stage to accommodate many student performers. Joseph Baker and Associates, Newark, Ohio, are the architects.



Bill Wilson

Jonesboro Elementary School auditorium, Bessemer, Alabama, has concrete roof bents and asphalt tile flooring. Architect is Wilmot C. Douglas of Birmingham, Alabama.



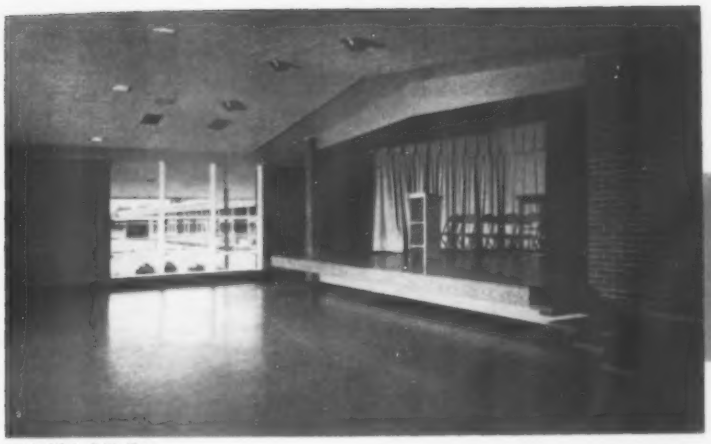
Gliessman

With a seating capacity of 1,200 the auditorium of the Canton Senior High School, Canton, Illinois, is designed for ideal hearing by a small audience as well as a capacity crowd. Architects are Atkins, Barrow and Associates of Urbana, Illinois.



Windows are omitted in the auditorium of the John W. Ligon Junior-Senior High School, Raleigh, North Carolina, to permit better artificial light control. Cooper, Haskins and Rice, architects.

Burnie Batchelor



Stage in the all-purpose room of the Sam Houston Elementary School, Port Arthur, Texas. Caudill, Rowlett, Scott, Neff and Associates, architects.

Ulric Meisel-Dallas



Heating is decentralized in the Burlingame Intermediate School, Burlingame, California, to permit use of the auditorium after school hours without operating a large central heating system. Hertzka and Knowles, architects.

Ernest Braun



Ernest Braun

Physical education unit of the Burlingame Intermediate School, Burlingame, California, contains a total of 7,482 square feet of area. The gymnasium has built-in bleachers. Hertzka and Knowles of San Francisco are the architects.

PHYSICAL EDUCATION



Burnie Batchelor

Gymnasium of the John W. Ligon Junior-Senior High School, Raleigh, North Carolina, is placed near the playground and athletic fields. Cooper, Haskins and Rice, architects.



Ulric Meisel-Dallas

Gymnasium of the Mirabeau B. Lamar Junior High School has a disappearing exterior wall. Caudill, Rowlett, Scott and Associates, Bryan, Texas, are the architects of the building.

Studio House



Studio House

Gymnasium and Social Hall Addition to the Lakewood High High School, Lakewood, Ohio. Lounge area has a snack bar at the far end. Hays and Ruth of Cleveland, Ohio, are the architects.

SOCIAL LIVING

Student Center of the Center Line High School, Center Line, Michigan. This area is completely designed in wood to radiate an interesting and warm feeling to students. Brender and Van Reyendam, Wayne, Michigan, are the architects.



INDOOR CORRIDORS



Corridor of the Lincoln Elementary School, Alexandria, Minnesota, has a fireplace at one end. There are display corners at classroom entrances, and lockers are flush with the corridor wall. Traynor and Hermanson are the architects.



Carlton L. Lingwall

Wooden wardrobe partitions line both sides of the corridor of the Lewis and Clark Elementary School, Great Falls, Montana. McIver, Hess and Haugsjaa, architects.

Corridor of the White Oaks Elementary School Annex, San Carlos, California, is used for circulation and for educational purposes. John Carl Warnecke, architect.

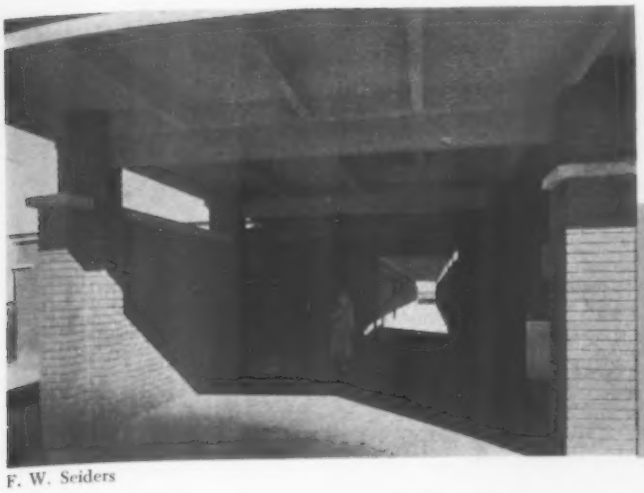


Rudy Kahn

Two continuous panels provide overhead lighting in corridor of the Ulysses S. Grant Elementary School, East Wenatchee, Washington. Alvin S. Erickson, architect.



OUTDOOR CORRIDORS



Porch-passages of the classroom wings of the Pearland High School Classroom Building, Pearland, Texas, serve for circulation and as wide sun awnings. Stayton Nunn, architect.

F. W. Seiders

Ernest Braun

Covered corridors connect classrooms of the Burlingame Intermediate School, Burlingame, California. Hertzka and Knowles, architects.

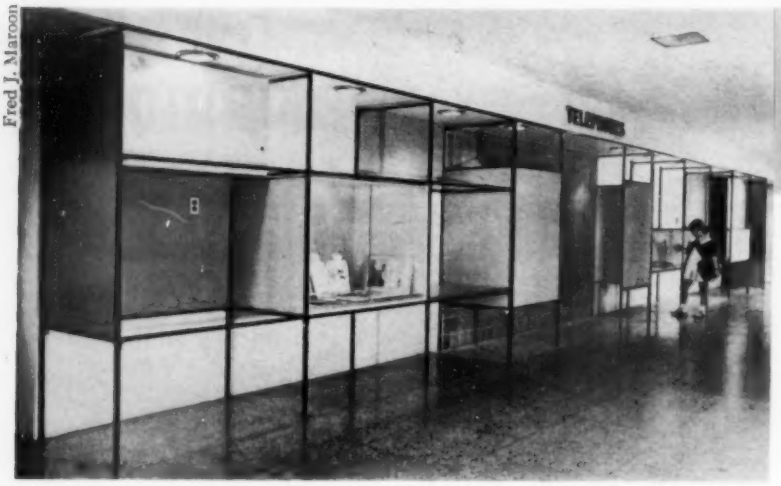




Classroom wings of the Woodridge Elementary School, Alamo Heights, San Antonio, Texas, have open corridors to the south. Harvey P. Smith and Associates, architects.

Zintgraff

Fred J. Maroon



Display cases and telephone booths form a wall unit along one side of the corridor of the Salem Avenue Elementary School, Hagerstown, Maryland. McLeod and Ferrara, architects, Washington, D. C.

DISPLAY AREAS

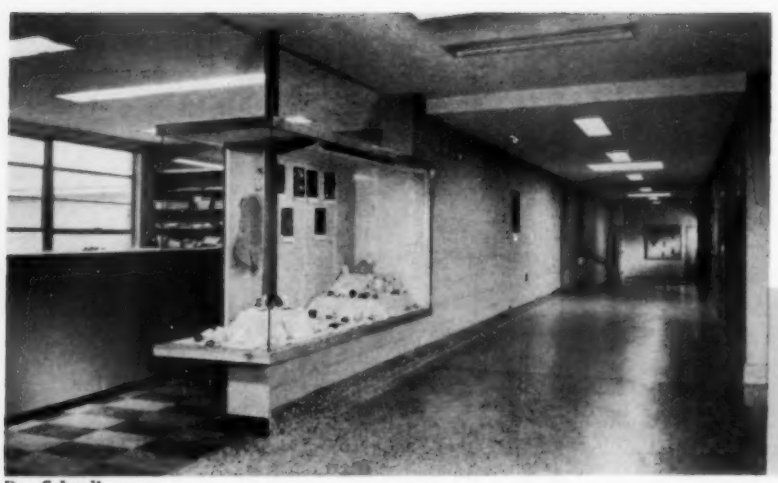
General Pictures



Classroom displays are shown at the corridor side in the Samuel J. Gier School, Hillsdale, Michigan. Warren S. Holmes Company, architects.



Wall recesses of the corridor hold a displarium for each classroom of the North Street Elementary School, Greenwich, Connecticut. Architects are Sherwood, Mills and Smith.



Ben Schnall

Office area and lobby display case in the Thomas Jefferson Junior High School, Fair Lawn, New Jersey, designed by Arthur Rigolo of Clifton.



A suspended translucent ceiling provides a pleasant luminous glow in classrooms of the Ulysses S. Grant Elementary School, East Wenatchee, Washington. Alvin S. Erickson, architect.

Rondal Partridge



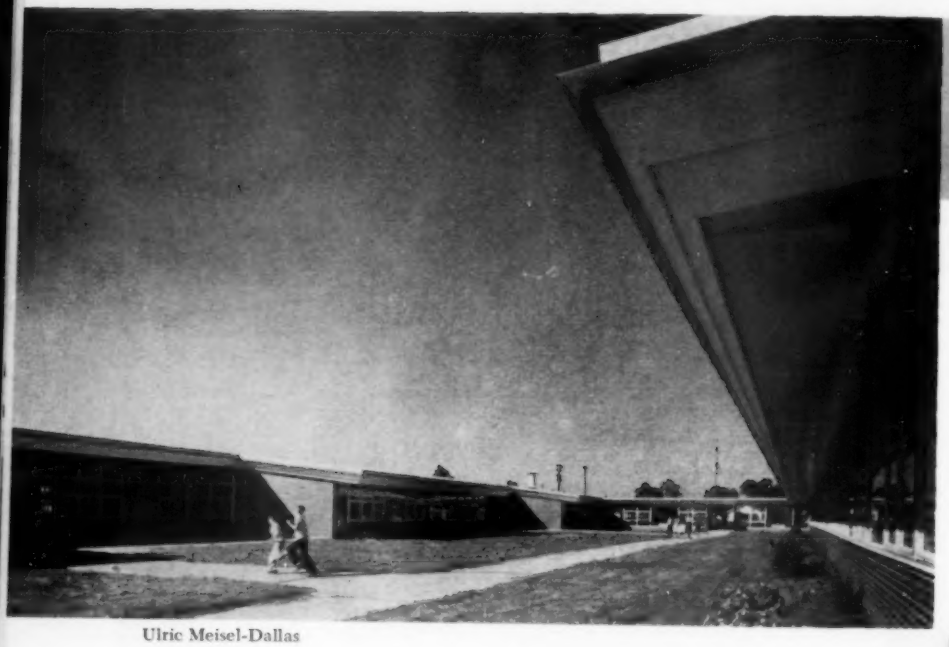
Skylight over the main corridor of the Annex to White Oaks Elementary School, San Carlos, California, consists of ¼-inch blue-green heat absorbing and glare resistant wire glass. John Carl Warnecke, architect.

LIGHTING

Glass blocks flanked by full length clear glass panels provide natural light, while artificial light is produced by indirect incandescent fixtures in classrooms of the Southwest Elementary School, Evergreen Park, Illinois. Architects are Bryant and Waichli of Chicago, Illinois.



Chicago Photographers

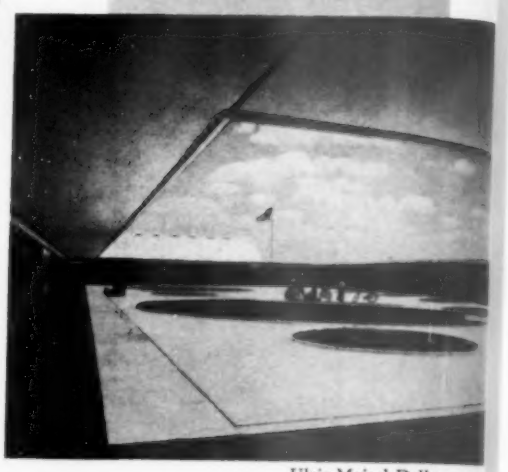


Ulric Meisel-Dallas

Outdoor teaching and play facilities are a reality at the Sam Houston Elementary School, Port Arthur, Texas. Architects are Caudill, Rowlett, Scott, Neff and Associates, Bryan, Texas.

A central plaza for social life is a feature of the Mirabeau B. Lamar Junior High School, Laredo, Texas, designed by Caudill, Rowlett, Scott and Associates.

OUTDOOR AREAS



Ulric Meisel-Dallas



Joseph W. Molitor

Double Oaks School, Charlotte, North Carolina, has individual outdoor areas for each classroom with direct access from the rooms. A. G. Odell, Jr., and Associates, architects.

Dodge County Normal School, Mayville, Wisconsin, houses college facilities for 60 students and an elementary school for grades one through eight. West and Anderson, Genoa City, Wisconsin, are the architects-engineers.



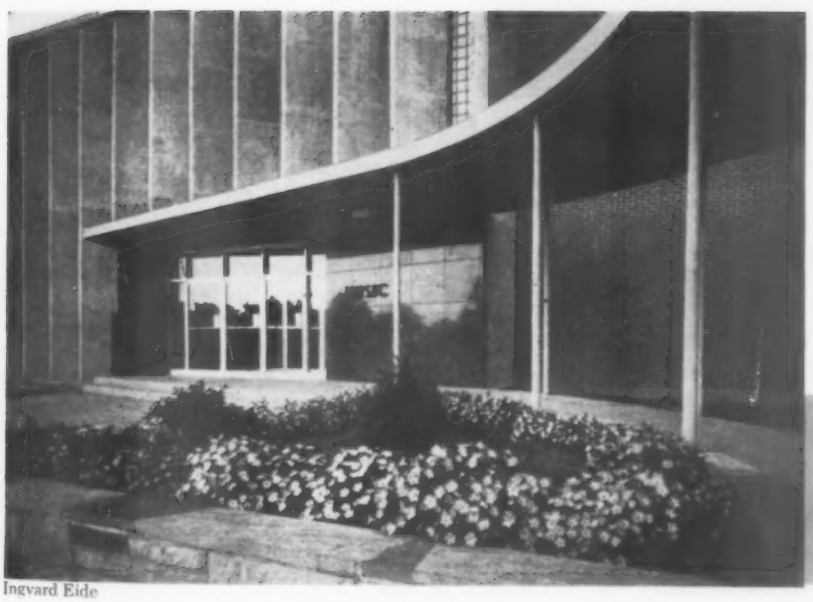
Edgar G. Mueller

For the first time in 25 years Compton College, Compton, California, occupies buildings and a campus of its own. Building units have been planned for the college by Austin, Field and Fry of Los Angeles, California.



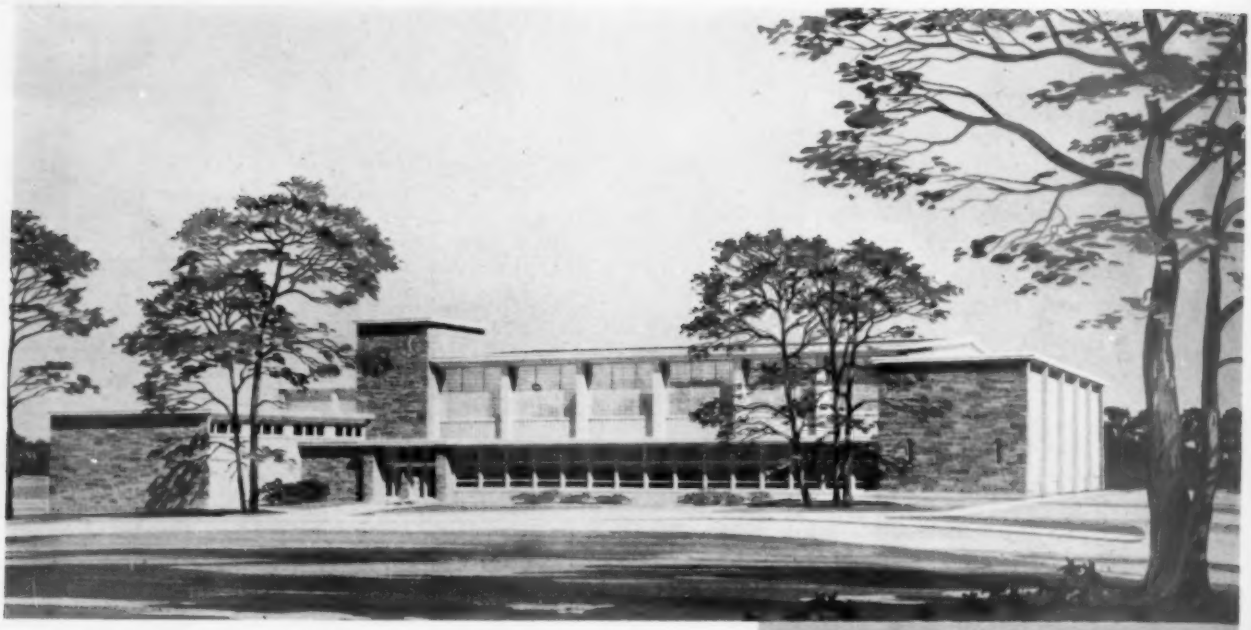
Julius Shulman

COLLEGE BUILDINGS



Ingvard Eide

Areas within the new Music Building for the University of Montana, Missoula, Montana, include 28 practice rooms, 7 teaching studios and a large recital hall. Fox and Ballas, architects.



Physical Education Building for Goucher College, Baltimore County, Maryland. The architects are Moore and Hutchins of New York, New York.

COLLEGE BUILDINGS



Henry Billings Shaw Natatorium, Miami University, Oxford, Ohio, houses an instruction pool and a large pool. Architect is Charles F. Cellarius, Cincinnati, Ohio.



Library for Youngstown College, Youngstown, Ohio, has a book stack capacity of 260,000 volumes. Kling and Frost are the architects.

PARTICIPANTS IN THE 1953 COMPETITION

● TOP AWARDS

■ HONORABLE MENTIONS

◆ SPECIAL FEATURES

ALFONSO ALVAREZ JR. & ASSOCIATES, Upper Montclair, New Jersey
Lafayette Combination School, Chatham Township, New Jersey

ANNAND, BOONE & LEI, Portland, Oregon
Parkrose Knott Street School, Portland, Oregon

R. V. ARNOLD, Bristol, Tennessee
Cleveland School, Russell County, Virginia

WARREN H. ASHLEY, West Hartford, Connecticut
◆ Groton Senior High School, Groton, Connecticut

ATKINS, BARROW & ASSOCIATES, Urbana, Illinois
Canton Senior High School, Canton, Illinois

AUSTIN, FIELD & FRY, Los Angeles, California
Arcadia High School, Arcadia, California
Compton College, Compton, California

E. L. BAKER—C. W. DINGMAN, Leominster, Massachusetts
Monson Academy, Monson, Massachusetts

JOSEPH H. BAKER & ASSOCIATES, Newark, Ohio
■ High School, Apple Creek, Wayne County, Ohio

LOUIS N. BALLUFF, Chicago, Illinois
Lincoln Elementary School, Brookfield, Illinois

EDWARD A. BERG, Denville, New Jersey
North Dover School, Dover, New Jersey
West Field Elementary School, Dover, New Jersey

OSWALD BERG, JR., Bozeman, Montana
Garfield School, Lewistown, Montana

H. E. BEYSTER & ASSOCIATES, INC., Detroit, Michigan
Avalon Elementary School, St. Clair Shores, Michigan

MAX W. BISSON—R. BEN JOHNSON, Owensboro, Kentucky
Southern Junior High School, Owensboro, Kentucky

LESLIE N. BONEY, Wilmington, North Carolina
Fayetteville Senior High School, Fayetteville, North Carolina
Sunset Park Elementary School, Wilmington, North Carolina

BRENDER & VAN REYENDAM, Wayne, Michigan
◆ Center Line High School, Center Line, Michigan

STANLEY BROWN, Dallas, Texas
Negro Combination School, Daingerfield, Texas
Elementary School Building, Rusk, Texas

BRYANT AND WALCHLI, Chicago, Illinois
◆ Southwest Elementary School, Evergreen Park, Illinois

BUCHART ENGINEERING CORPORATION, York, Pennsylvania
King's Highway Elementary School, Coatesville, Pennsylvania

RHEES BURKET, Washington, D. C.
Williamsburg Junior High School, Arlington County, Virginia

CAUDILL, ROWLETT, SCOTT & ASSOCIATES, Bryan, Texas
● Mirabeau B. Lamar Junior High School, Laredo, Texas

CAUDILL, ROWLETT, SCOTT, NEFF & ASSOCIATES, Bryan, Texas
● Sam Houston Elementary School, Port Arthur, Texas

CHARLES F. CELLARIUS, Cincinnati, Ohio
Henry Billings Shaw Natatorium, Miami University, Oxford, Ohio

COCKE, BOWMAN & YORK, Harlingen, Texas
Ebony Heights Elementary School, Brownsville, Texas

CONE AND DORNBUSCH, Chicago, Illinois
Jackson Elementary School, Elmhurst, Illinois

FRANK IRVING COOPER ASSOCIATES, East Milton, Massachusetts
Jackson Street School, Northampton, Massachusetts

COOPER, HASKINS & RICE, Raleigh, North Carolina
John W. Ligon Jr-Sr High School, Raleigh, North Carolina

JOHN JAMES CROFT, JR., Asheboro, North Carolina
Lindley Park Elementary School, Asheboro, North Carolina

LEO A. DALY COMPANY, Omaha, Nebraska
Belle Ryan Elementary School, Omaha, Nebraska

DANIEL, MANN, JOHNSON & MENDENHALL, Los Angeles, California
Foster A. Begg Intermediate School, Manhattan Beach, California

RUSSELL GUERNE deLAPPE & MITCHELL VAN BOURG, Berkeley, California
Travis Air Force Base Elementary School, Suisun, California

EMILIE JOHN DiRIENZO & WARREN S. HOLMES CO., Mount Vernon, New York
Quaker Ridge School Addition, Scarsdale, New York

WILMOT C. DOUGLAS, Birmingham, Alabama
Jonesboro Elementary School, Bessemer, Alabama

DURRANT AND BERGQUIST, Dubuque, Iowa
Washington Elementary School, Waupun, Wisconsin

C. LYMAN ELLIS & COMPANY, Harlingen, Texas
Port Isabel High School, Port Isabel, Texas

ALVIN S. ERICKSON, Wenatchee, Washington
Ulysses S. Grant Elementary School, East Wenatchee, Washington

FEHR & GRANGER, Austin, Texas
O. Henry Junior High School, Austin, Texas
Crain Junior High School, Victoria, Texas

MAX FLATOW–JASON MOORE, Albuquerque, New Mexico
Irene McCormick Grade School, Farmington, New Mexico

EDWARD FLEAGLE, Yonkers, New York
Fleetwood Elementary School, Yonkers, New York

FOIT & BASCHNAGEL, Buffalo, New York
North Hill Elementary School, Cheektowaga, New York

FOX & BALLAS, Missoula, Montana
Music Building, University of Montana, Missoula, Montana

GIFFELS & VALLET, INC., L. ROSSETTI, Detroit, Michigan
Frank H. Cody High School & Edward Everett Elementary School, Detroit, Michigan
Seminole Hills Elementary School, Mount Clemens, Michigan

HARRISON GILL & ASSOCIATES, Chattanooga, Tennessee
Chicamauga School, Hamilton County, Tennessee

MICHAEL GOODMAN, Berkeley, California
Biochemistry & Virus Laboratory Building, University of California, Berkeley, California

ROBERT A. GREEN, Tarrytown, New York
Walt Whitman Elementary School, Woodbury, L. I. New York

OSCAR M. HANSEN, Savannah, Georgia
Juliette Low Elementary School, Savannah, Georgia

ALONZO J. HARRIMAN, INC., Auburn, Maine
Elementary School, Skowhegan, Maine
Bar Harbor, Maine, Elementary School

HAYS AND RUTH, Cleveland, Ohio
Gymnasium and Social Hall Addition, Lakewood High School, Lakewood, Ohio

LOUIS G. HESSELDEN, Albuquerque, New Mexico
Sandia Base Elementary School, Albuquerque, New Mexico
Woodrow Wilson Junior High School, Albuquerque, New Mexico

HERTZKA & KNOWLES, San Francisco, California
Burlingame, California, Intermediate School

WARREN S. HOLMES COMPANY, Lansing, Michigan
Samuel J. Gier Elementary School, Hillsdale, Michigan

VICTORINE & SAMUEL HOMSEY, Wilmington, Delaware
Frederick Douglass Stubbs Elementary School, Wilmington, Delaware

HUDGINS, THOMPSON, BALL AND ASSOCIATES, Oklahoma City, Okla.
New Classen High School, Oklahoma City, Oklahoma

WILLIS IRVIN, ARCHITECT, HELEN STUART IRVIN, ASSOCIATE, Augusta, Georgia
Millbrook and North Aiken Elementary Schools, Aiken, South Carolina

WILLIAM B. ITTNER, St. Louis, Missouri
Addition to Des Peres School, Kirkwood, Missouri

JOHNSON & BOTESCH, Everett, Washington
Mountlake Terrace Elementary School, Edmonds, Washington

JOHNSON & BOUTIN, Washington, D. C.
St. Catherine Labouré Elementary School, Wheaton, Maryland

LEO T. KABIS, Denville, New Jersey
St. Mary's School, Denville, New Jersey

EDWIN A. KEEBLE, Nashville, Tennessee
Hillsboro High School, Nashville, Tennessee

KELLY & GRUZEN, New York, New York
Albert Einstein College of Medicine, Yeshiva University, Bronx, New York

WILBUR KENT, Lufkin, Texas
Senior High School, Lufkin, Texas

HOLLIS W. KINCAID, Hartford, Connecticut
Henry Barnard Hall, New Britain, Connecticut

A. M. KINNEY, INC., CHARLES BURCHARD, Director of Architecture, Cincinnati, Ohio
Madeira Elementary School, Madeira, Ohio

KLING & FROST, Youngstown, Ohio
Youngstown College Library, Youngstown, Ohio

CARL C. KRESSBACH, Jackson, Michigan
Concord Community Agriculture School, Concord, Michigan
Vandercook Lake Elementary, Vandercook Lake, Michigan

KUEHNE, BROOKS & BARR, Austin, Texas
Anderson High School, Austin, Texas

LANG AND RAUGLAND, Minneapolis, Minnesota
Concord Elementary School, Edina, Minnesota

RAYMOND N. LE VEE & ASSOCIATES, Appleton, Wisconsin
Lincoln Elementary School, Appleton, Wisconsin

LEINWEBER, YAMASAKI & HELLMUTH, Detroit, Michigan
• Detroit University School & Grosse Pointe Country Day School, Grosse Pointe Woods, Michigan

CHARLES W. LORENZ, Kirkwood, Missouri
Manchester Elementary School, Manchester, Missouri

MAGNEY, TUSLER & SETTER, Minneapolis, Minnesota
New Elementary School, Faribault, Minnesota
♦ Alexander Ramsey Jr-Sr High School, Ramsey County, Minnesota

McIVER, HESS AND HAUGSJAA, Great Falls, Montana
Lewis & Clark Elementary, Great Falls, Montana

McLEOD & FERRARA, Washington, D. C.
Tuckahoe Elementary, Arlington County, Virginia
♦ Salem Avenue Elementary School, Hagerstown, Md.

RALPH BENDA MODJESKI, Santa Ana, California
Carl Harvey School, Santa Ana, California

BOLTON C. MOISE JR., Riverside, California
Riverside College Gym & Play Field Development, Riverside, California
Riverside Polytechnic High School, Riverside, California

MOORE & HUTCHINS, New York, New York
Cooperstown Elementary, Cooperstown, New York
Physical Education Building, Goucher College, Baltimore, Maryland

R. W. NAEF, Jackson, Mississippi
Greenville High School, Greenville, Mississippi

WILLIAM E. NASH, Bryan, Texas
■ Ben Milam Elementary School, Bryan, Texas

STAYTON NUNN, Houston, Texas
Pearland High School Classroom Building, Pearland, Texas

A. G. ODELL, JR., AND ASSOCIATES, Charlotte, North Carolina
• Double Oaks Elementary School, Charlotte, North Carolina

PACE ASSOCIATES, Chicago, Illinois
♦ White Pine Elementary School, White Pine, Michigan

PAGE AND SMITH, Raleigh, North Carolina
Cafeteria & Elementary Class Building, Wakelon School, Zebulon, North Carolina
Library Building, Sanford, North Carolina, High School

LOWELL E. PARRISH, Salt Lake City, Utah
Hillcrest Elementary School, Murray, Utah

JOHN LYON REID, San Francisco, California
• Deer Park Elementary School, Fairfax, Marin County, California
• Manor Elementary School, Fairfax, Marin County, California

REISNER, URBAHN, BRAYTON & BURROWS, New York, New York
Long Island Agricultural and Technical Institute, Farmingdale, L. I., New York
Central School, Star Lake, New York

ARTHUR RIGOLO, Clifton, New Jersey
Lyncrest School, Fairlawn, New Jersey
Thomas Jefferson Junior High School, Fairlawn, New Jersey

ZEB RIKE & R. GOMMEL ROESSNER, McAllen, Texas
Raymondville High School, Raymondville, Texas

SARGENT, WEBSTER, CRENSHAW & FOLLEY, Syracuse, New York
■ Liverpool Elementary School, Liverpool, New York

SCHMIDT, GARDEN & ERIKSON, Chicago, Illinois
New Skinner Elementary School, Chicago, Illinois

RONALD S. SENSEMAN, Takoma Park 12, D. C.
Wheaton High School, Wheaton, Maryland

HOWELL LEWIS SHAY, Philadelphia, Pennsylvania
■ Springfield High School, Springfield, Pennsylvania

SHERWOOD, MILLS & SMITH, Stamford, Connecticut
■ North Street Elementary School, Greenwich, Connecticut
♦ Newfield Elementary School, Stamford, Connecticut

PAUL G. SILBER & COMPANY, San Antonio, Texas
Elementary School, San Antonio, Texas
Edgewood High School, San Antonio, Texas

HARVEY P. SMITH & ASSOCIATES, San Antonio, Texas
Woodridge Elementary School, San Antonio, Texas
Lackland Air Force Base School, San Antonio, Texas

SMITH, VOORHEES, JENSEN, SILLETTO & ASSOCIATES, Des Moines, Iowa
Elm Park Elementary School, Webster City, Iowa

WALTER H. SOBEL–J. STEWART STEIN, Chicago, Illinois
Leyden Community High School, Franklin Park, Illinois

STAINBACK AND SCRIBNER, Charlottesville, Virginia
Lightfoot Elementary School, Unionville, Virginia
Consolidated High School, Halifax County, Virginia

EUGENE D. STERNBERG, Denver, Colorado
Pantall Elementary School, Sterling, Colorado
Englewood Primary School, Englewood, Colorado

SWANSON ASSOCIATES, Bloomfield Hills, Michigan
Northwest Elementary School, Oak Park, Michigan
Pembroke Elementary School, Birmingham, Michigan

JAMES M. TAYLOR, ARCHITECT, JAMES B. TAYLOR, ASSOCIATE, Seattle, Washington
Lutacaga Elementary School, Othello, Washington

L. G. THOMSON, Chico, California
Rosedale Elementary School, Chico, California
Chico Junior High School, Chico, California

THORSHOV—CERNY, INC., Minneapolis, Minnesota
Roosevelt Park High School, Fergus Falls, Minnesota

TRAYNOR AND HERMANSON, St. Cloud, Minnesota
Lincoln Elementary School, Alexandria, Minnesota

VAHLBERG PALMER VAHLBERG, Oklahoma City, Oklahoma
Erick Grade School Erick, Oklahoma

J. HENLEY WALKER, JR., Richmond, Virginia
Southside Day Nursery, Richmond, Virginia

JOHN CARL WARNECKE, San Francisco, California
* White Oaks Elementary School Annex, San Carlos, California

R. L. WARREN & WILLIAM HENRY TAYLOR, Pasadena, California
East Whittier Administration Office and Warehouse, East Whittier, California

BERTRAM A. WEBER, Chicago, Illinois
Kildeer Countryside Elementary School, Prairie View, Illinois

W. C. WEEKS, INC., Sheboygan, Wisconsin
James Fenimore Cooper Elementary School, Sheboygan, Wisconsin

WEST AND ANDERSON, Genoa City, Wisconsin
Dodge County Normal School, Mayville, Wisconsin

WOLF & HAHN, Allentown, Pennsylvania
Southern Lehigh Jr-Sr High School, Center Valley, Lehigh County, Pennsylvania

PAUL L. WOOD, VOORHEES, WALKER, FOLEY & SMITH, New York, New York
Junior-Senior High School, Manhasset, New York

THOMAS WORCESTER, INC—CHARLES H. COLE, Boston, Massachusetts
Memorial Park School, Rockland, Massachusetts

VICTOR LOUIS WULFF, WULFF, BISHOP & RITTER, Spokane, Washington
Senior High School, Pasco, Washington

WURSTER, BERNARDI & EMMONS, San Franciso, California
* Multi-Use Wing, Adelia Kimball Elementary School, Antioch, California
Antioch Senior High School, Antioch, California

TOP AWARD WINNERS, 1951 COMPETITION

CAUDILL, ROWLETT, SCOTT AND ASSOCIATES, Bryan, Texas
Elementary School, Stillwater, Oklahoma

EDWARD FLEAGLE, Yonkers, New York
Colonial Heights Elementary School, Yonkers, N. Y.

REISNER & URBAHN, New York, New York
Lido Beach School, Long Beach, New York

EATON W. TARBELL & ASSOCIATES, Bangor, Maine
Vine Street School, Bangor, Maine

JOHN CARL WARNECKE, San Francisco, California
Mira Vista Elementary School, El Cerrito, California

SHARP & THOMPSON, BERWICK, PRATT, Vancouver, B. C., Canada
Stanley Humphries School, Castlegar, British Columbia, Canada

TOP AWARD WINNERS, 1952 COMPETITION

DONALD BARTHELME AND ASSOCIATES, Houston, Texas
West Columbia, Texas, Elementary School

RALPH BURKHARD, Seattle, Washington
Foster Junior-Senior High School, Seattle, Washington

KETCHUM, GINÁ AND SHARP, New York, New York
Darien, Connecticut, Junior High School

WILLIAM G. LYLES, BISSETT, CARLISLE AND WOLFF, Columbia, South Carolina
Wagener Twelve-year School, Aiken County, South Carolina

PERKINS AND WILL, Chicago, Illinois
Northfield Township High School, Cook County, Illinois

EDUCATIONAL CONSULTANTS— THEIR FUNCTIONS AND WORK



by CARL F. GUENTHER

Outcalt, Guenther and Associates, Architects, Cleveland, Ohio

Mr. Guenther received his Bachelor of Architecture degree from Western Reserve University. He also attended the Fontainebleau School of Fine Arts, France, and the Ecole des Beaux Arts, Paris, as holder of the 24th Paris Prize in Architecture. Mr. Guenther was a lecturer at the Cleveland School of Architecture, Western Reserve University, for eight years and has practiced architecture in Cleveland since 1934. He has been associated with Outcalt, Guenther and Associates since 1945.

THE organization of the educational administrative structure as we know it today is a comparatively recent innovation. Before the turn of the century, most of the administrative direction of our school systems was vested in boards of education who not only determined policy but were effective, more or less, in directing application of that policy to the educational program offered. Since members of boards of education were normally occupied in other vocational fields, the administrative aspects naturally suffered.

Following the democratic pattern of government in this country it was inevitable that the next addition to the organizational pattern of our school systems would be the school superintendent as the administrative head, charged with the responsibility of carrying into practice the policies determined by the board itself, and acting as the liaison officer between the teaching staff and the community as represented by the elected board. From the early days as "office boy" the role of the school superintendent has grown to one of stature and importance.

New Source of Assistance

With the expansion of our educational programs, embracing not only the children but the adults of our communities as well, his duties have multiplied to the point that administration of the educational program is consuming most of his time. Since his education and experience too often do not involve extensive contact with the problems in planning and executing a building program, there has arisen a new field that can offer him, together with his board, sorely needed advice and assistance—namely that of the educational consultant.

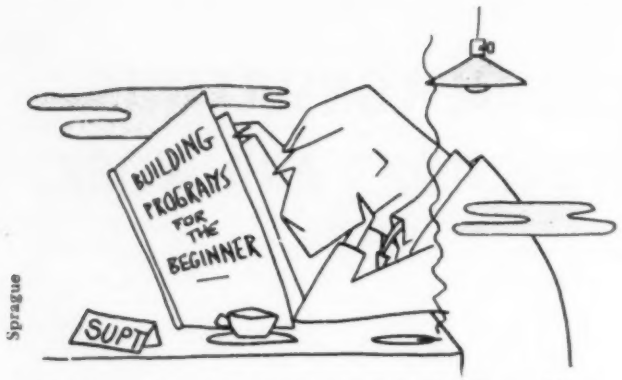
There are relatively few men and organizations in this country who are capable and available to give such counseling services to school districts facing a building problem. They operate principally in the following manner:

1. As members of an organization normally connected with a college or university offering a trained staff for consulting services.
2. As members of school building divisions within state departments of education.
3. As individuals offering full-time professional counseling.
4. As individuals connected with school systems or colleges, offering part-time assistance.
5. As individuals connected with architectural firms.

The last named category is perhaps the most recent development. Since architectural services are a vital and necessary part of an enlightened building program, the combination of these two professional services in one package has the advantage of closer relationship and responsibility vested in one source.

Consultants Are Necessary

Regardless of source, educational consultants have one thing in common, normally, that they are men with a school background, interested and experienced in planning procedures. They are a necessary member of the "team." (See *The School Executive*, July, 1953, page 48.) Although it has been suggested before by



School executives often are not schooled in building problems.

the writer that planning should be a continuing function of every school system, educational consultants are normally engaged only when a major building program becomes acutely imminent. A proper realization of the services offered and the work to be performed by the consultant, with its resultant time requirements element, would aid school boards and school administration in preventing costly errors in planning because of emergency problems that must be met.

Studies to Be Conducted

Before a building program can be crystallized, a detailed study of current and future educational programs, of school plant needs, finance, business management and school population should be made. For school systems engaging an educational consultant for the first time this survey or evaluation of the system is a must, and is the initial service that the consultant can offer.

Such a study begins with the community, because the organization and operation of a school system is affected more or less by the character of the community it serves. A review of its historical background, the character of its population, the various factors which may influence its growth or decline, and the other physical and social characteristics clearly aid in the determination of plans for the future of the school system as an integral part of the community.

Tied in with the characteristics of the community is its ability to support a school system. The raising of money for school purposes and the skillful expenditure of funds is necessary to secure the best educational program a community can afford, with the least waste and inefficiency. A review and statement of the financial picture and the business management practices of the school system is the second phase of the survey.

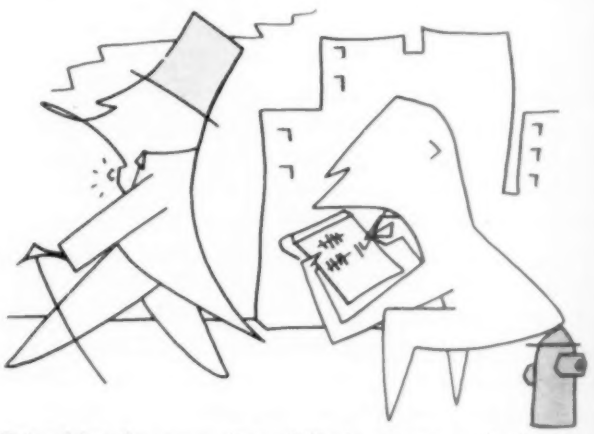
Next comes the evaluation of the existing school plant, since this represents a substantial outlay of community money that has already been made. Standards have been formulated and score cards and other devices developed for evaluating school buildings in terms of adequacy in providing desirable school facilities. Methods have also been conceived for judging the utilization of school buildings and for calculating their capacities. This analysis clarifies adequacy of site, building, academic classrooms, special classrooms, general service rooms, administrative rooms and service systems of all property in the school system.

The fourth consideration of physical aspects of the school system is the element of school population. School enumerations, enrollments and trends in numbers of births must be studied for predicting future enrollments. Anticipated school population must be given careful consideration in order to plan intelligently concerning the number, size and location of school centers.

Evaluating Educational Aspects

The second and perhaps major phase of the initial survey is the evaluation of the educational aspect of the school system. This will involve a study of the philosophy and objectives of education in the community, an analysis of the organization and staff and a review of the existing and anticipated future educational program, both on the elementary and secondary school levels. Academic subjects, special subjects and related activities are carefully scrutinized in terms of their contributions to child and community development.

Up to now we have been dealing with the "leg work" of the consultant, gathering material at various sources, interviewing numerous individuals, groups and organizations. All of this is sifted, combed and made



Determining the community's ability to support a school system.

the basis of a report embodying recommendations pertaining to school and community relationship; school system organization involving administration, finance and business management; and the educational program. Along with the educational aspects are presented the overall program or long-range master plan for the school plant, defining generally the elimination of sub-standard and obsolete structures; the use, alteration, and/or additions to remaining school buildings; and the type, size and construction of new school

centers. At this point the educational consultant enlists the aid of another member of the team, the architect, who with his more specific and technical knowledge of buildings is able to make contributions regarding the possibilities of existing buildings for continued use in light of future educational programs.

Cost Estimates Result from Teamwork

The cost estimations of such a building program are also the result of teamwork by these two professionals. Although initial educational planning should proceed in terms of ideals, it will soon become apparent that such ideals must be compromised with the financial ability of the community. It has been often stated that architectural design proceeds by a series of compromises. The lot of educational planning must of necessity be similar. Since the dollar sign is the inevitable controlling factor, the cost picture of the contemplated building program and *educational program* must be thoroughly studied and presented. The requirements and methods of financing the programs by levies and bonds complete the first picture presented by the educational consultant.

Unfortunately in many communities the work of the educational consultant is terminated at this point although additional work relating to implementation of the overall program remains to be accomplished. Believing that continuation of the educational specialists' services is the only path to a well coordinated end result, the office of the writer some years ago added an educational consultant to its staff to provide a complete professional service during the "active" part of the building program. Whether as a direct member of the architectural staff or as an independent professional, the work of the consultant from this early stage to the completion of the entire program is much the same.

How the Services Proceed

Upon adoption of the initial report and approval of the overall program the educational consultant's services proceed in the following manner:

He assists the board and the school administrator in the formation of local citizens committees for work in the bond campaign. With the initial report furnishing most of the background he, together with the architect, supplies the "ammunition" for the committees' use in disseminating information regarding the status and needs of the school system, and the means whereby the suggested program can assure the community a well rounded school system.

Upon final approval of the overall program by the community, as evidenced by successful financial support, he assists the administration in the organization and initiation of the work of local planning committees. This generally takes the pattern of a general or overall committee for the entire building program, a committee for each division in the vertical organization of the school system, and special committees dealing with various aspects of the school program and building facilities. Various members of the school staff, teachers, custodians and administrators, laymen in the community and, in many cases, pupils are drawn into the planning process. Consultants supply material designed to assist the committees, and organize their efforts to obtain and assemble all data and proposals necessary for effective educational planning in terms of the approved and selected program of education with due regard for future possible changes in the program.

Work of the Consultant

The major responsibility for work in the next stage rests with the consultants. It involves making a thorough analysis of all available data, formulation of



The consultant gathers the results of his investigations into a report, complete with recommendations to the school system.

building requirements for the various types of buildings involved, and the preparation of reports to transmit these requirements to the architects. The work includes:

1. Analysis of committee reports and other data collected and furnished.
2. A check of enrollment estimates for each grade and for elective and special curricular activities.
3. A check of the basic plan for meeting local school plant needs in view of the additional information obtained above.
4. Calculation of room and space requirements.
5. Determination of the best uses for existing facilities where additions are involved.
6. Preparation of a statement of quantitative room and space requirements for individual buildings. This program of requirements should cover the building site, the general nature and function of the building, the building capacity,

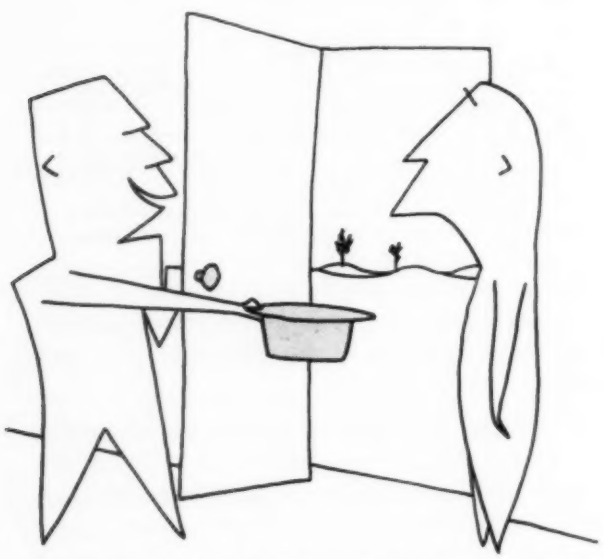
the facilities required showing number, types, sizes and special requirements of each room or facility, the community use of building facilities and the overall anticipated cost.

7. Preparation of a report of qualitative building requirements for various types of buildings. This guide for planning should cover development of the site, general characteristics of the building, interior spaces and rooms, building details and service systems and equipment.
8. Preparation of outline specifications and suggestive sketch layouts for special rooms, features and equipment.

Although the above work is primarily that of the consultant, he draws upon the architect for assistance and checks constantly with the local administrators and planning committees concerning adaptability to local needs.

The Architect Carries On

At this stage the ball is carried by the architect and, during the development of the preliminary plans for each building in the program, the consultant assists by interpretation of the prepared educational specification. Every scheme is carefully checked for conformity and evaluated in relation to the educational



All too often the work of the educational consultant is terminated before the building program is fully under way.

requirements. During the detailed development of the plans and specifications, consultants assist local committees with the preparation of equipment layouts for special rooms, and when plans are completed a final check for conformity with educational requirements is made. Occasionally during this stage complex design problems, which have a bearing on educational uses, arise where the educational consultant can assist in the procurement of expert technical consultants.

Too often at the completion of a building project there is the mad rush to move in, to relieve an emergency crowded situation elsewhere and little thought is given to the successful use of the building in terms of the educational program that was the nucleus of the planning process. The relief is so great, so evident, that there is a tendency to "sit back on your heels" and coast in. Many times the writer has seen new buildings, carefully planned and equipped, used to half-capacity educationally speaking. Here is the chance for the first follow-up on the part of the consultant. Since not all of the teaching staff can participate in the planning process, and the mortality rate in the teaching profession being what it is, some introduction of the plant to the staff and the staff to the plant must be made. As the architect is charged with acquainting the operating staff with the mechanical functions of the new plant, the educational consultant should aid in the development of effective means of educating the staff in use of the new surroundings.

The final stage in educational planning is concerned with the evaluation of the completed buildings after they have been in use for some time in terms of their suitability for housing the educational program. Some attempt must be made to judge the accuracy of conclusions made during the planning process. Only by such final review and checking can future intelligent planning proceed.

When the time element of the services of the educational consultant is considered it can easily be ascertained that a period of many years passes between the beginning of the survey to final evaluation of the building projects. Because of the presently high birth rate and, remembering in retrospect the lack of any major school construction between the late twenties and the present high school building construction period, it is evident that the future will see much additional replacement of obsolete and worn out buildings. The present wave of construction is in the main providing additional classroom space only.

Services Should Continue

In most communities it is safe to assume that the completion of one school building program will only herald the start of another. Here then is the need for continuing use of the services of the educational consultant, continuing study of the relationship of building to child development, building to educational program and building to adult participation on a community-wide level. The educational consultant is a permanent member of the team to assure the continued creative development of education in our society.

FLOW CHARTS OF SCHOOL BUILDING PLANNING



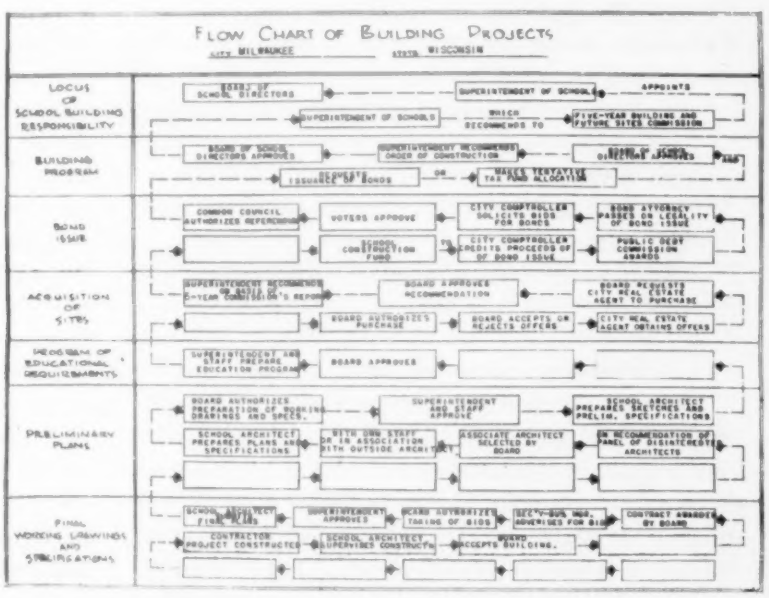
by N. L. ENGELHARDT, SR.

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

As an educational consultant to school systems throughout the country Dr. Engelhardt has made invaluable contributions to the whole field of education. Now a senior member of Engelhardt, Engelhardt and Leggett, he had taught at Teachers College, Columbia University for 27 years and was Associate Superintendent of New York City schools for five years. With his partners Dr. Engelhardt has written *Planning Elementary School Buildings*, 1953, as well as *Planning Secondary Schools and Planning Elementary Schools*.

PROGRESS in the advancement of school building projects from site selection to dedication varies widely among the school districts of the nation. The number of agencies participating in the planning, the functions they perform and the dependence upon authoritative bodies meeting only every month or at some other fixed interval of time have their effect upon the time consumed from inception to completion of a project. The period allowed for estimating and adve tisin ; for bids and other local policies, such as those associated with the signing of building contracts, have a definite relationship to the time consumed in building a schoolhouse. The stages through which a building project usually passes may be outlined as follows:

1. The analysis of the processes and recognition of responsibilities allocated to the various authorities who will participate as work of the school building program moves ahead.
2. Carrying out the school building survey through which the need for each project is ascertained.
3. Arriving at official decisions governing method and procedures for financing each project.
4. Assuring the operation of democratic processes with citizen participation and instruction at all stages.
5. The establishment of standards for professional services to be purchased and official documents associated with the planning and construction phases.
6. The selection of planning personnel.



Flow chart of building projects in the city of Milwaukee, Wisconsin, shows the steps taken in seven major stages of the project—locus of school building responsibility; the building program; the bond issue; acquisition of sites; program of educational requirements; the preliminary plans; and the final working drawings and specifications.



This series of concentric circles illustrates the simplest form of building program organization. The board of education is at the center, and all activities revolve around it. The board of education occupies the pivotal position for all concerned.

7. Agreement upon the educational requirements or specifications for each project with full participation by the educational staff.
8. Site selection and acquisition through cooperation with community planning authorities.
9. Conference stages in which the first building sketches, building models and character of the architectural design are discussed and tentative determinations are made.
10. Review of preliminary plans through several steps of revision and the taking of official action.
11. Official review and amendment of preliminary specifications for building finishes and materials.
12. Official analysis of the building budget and estimates of cost and referral to the proper confirming and appropriating bodies.
13. Review and approval of final working drawings and specifications with authorization to go ahead with advertising for bids.
14. The opening of bids and the award of contract for construction.
15. Supervision of construction and final official acceptance of the building.

Problems Lurk at Each Stage

Here are outlined fifteen major stages of the work. Hidden behind each stage, however, lurk many problems of greater or lesser magnitude. Their number and character depend upon the involvements of city government, the degree of fiscal and managerial independence of the board of education, the controls imposed by state departments of education and the influences exercised by state or local regulatory and advisory bodies concerned with capital budgets, city planning, architectural design, health, sanitation and safety of the structure and its occupants.

In this country there is no fixed and uniform procedure or series of steps through which the planning of a school building flows for all cities. Fifteen have been listed above but their number and chronological rank may change in the many school districts. If school administrators listed all the stages for their own communities they would vary by from 10 to 60 or more steps. What would appear to be similar steps take on different scopes, emphases or connotations from city to city. The New England town meeting, the large city board of estimates or of finance, the city art commission, the county board of supervisors, the state fire marshal and many other agencies of government tend to add color and interest to the school building planning business, but they may also create roadblocks or make detours necessary, thereby adding new steps or causing time-costly delays.

The multiplication of agencies empowered to review or make decisions has resulted from a desire to safeguard funds, to secure economies, to ensure adaptability to city design and plan, to keep politics out and to keep educational needs foremost. At least these are tenable assumptions. The fact is that the cost of multiple participation by governmental bodies has never been fixed but is assuredly mounting. This certainly becomes evident in flow charts when one relates over-

head, special skills and services of paid groups and individuals to the sum total of activities associated with school planning.

Participation by Citizens

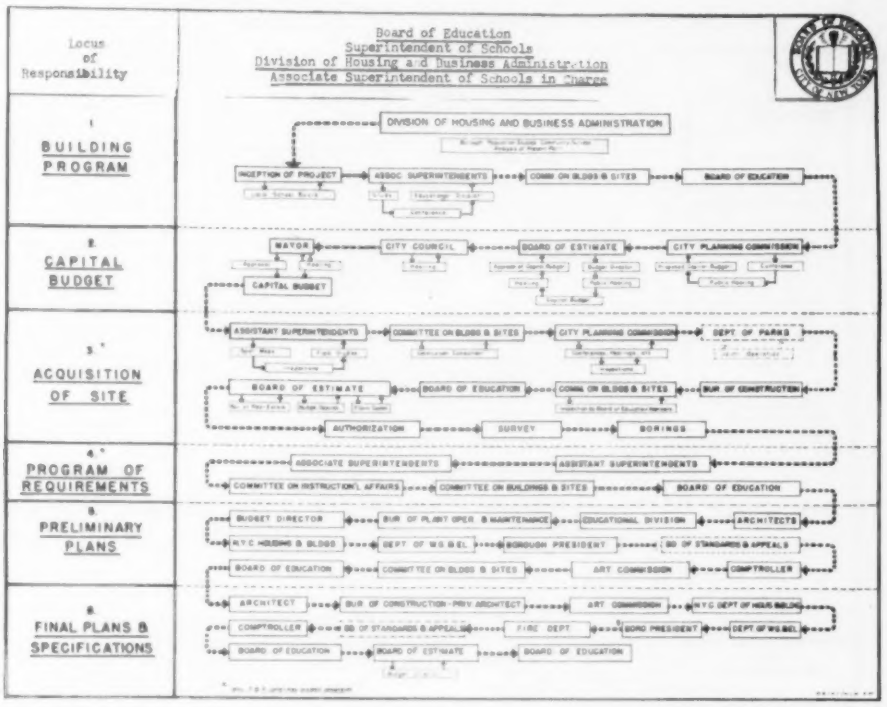
Mention must also be made of the important and meaningful participation by citizens in all stages of planning, and of teaching and supervisory members of the educational staff who make basically essential and knowledgeable contributions to adapting and adjusting site and building spaces to local educational and community needs. Citizens give of their time freely; the costs for time spent by the educational staff is rarely charged against the school building budget but is absorbed in the current annual budget.

It would seem that a simple organization with acknowledged placement of responsibility will work best. However, in many situations planning a school building and fitting it into a comprehensive community has become a complex problem. Taxpayers and city officials, highway and utilities experts, the school board and its administrative and financial agents, school principal and classroom teachers, parents and the press are among the many who contribute to the success or failure of the project. Project organization should assure contact with any and all who can aid in betterment of the final product. It is of the essence, however, that responsibility for decisions must be lodged in a few if the work is to move forward expeditiously.

The preferred organization gives the board of education jurisdiction over all phases of the planning—financial, educational and contractual. The board operates through its superintendent of schools and other administrative offices; it selects its educational consultant, architects and engineers; it approves plans, advertises for bids and awards contracts. In all stages of the planning the board of education provides means for securing advice from other city officials, teachers and parents which will result in improvement of the school. In other words, channels for the operation of the democratic processes are kept open, but definite responsibility for the advancement of the work is assured.

A Simple Form of Organization

The simplest form of organization might be graphically represented by concentric circles around the board of education as the center. Responsibility and authority move from the outer fringes to the central point. Contributions to planning will come from the individuals, organizations or constituted authorities in each circle, but the impact of all suggestions and recommendations is upon the board of education.



A New York City building program which was carried out in 1942–1947 involved approximately 100 projects. About 50 steps were required, as is shown in this flow chart of building projects.

The Most Complex Organization

The accompanying diagram represents the maze of steps or stations through which a school building project passed in the period 1942–1947 in the largest city of the nation in a program of approximately 100 projects. Approximately 50 steps are shown varying, to be sure, in importance and degree of responsibility. That the needs of the educational program can remain paramount through all these reviews and official checks speaks well for the people's faith in public education. In the last analysis, parents and teachers continue to insist on schools which meet the needs of children. The steps along the route of a school building project in a small

school system are practically identical with those in this chart. Fortunately, there is less competition for building funds among projects and, in most communities, less struggle for political recognition in the completion of a project.

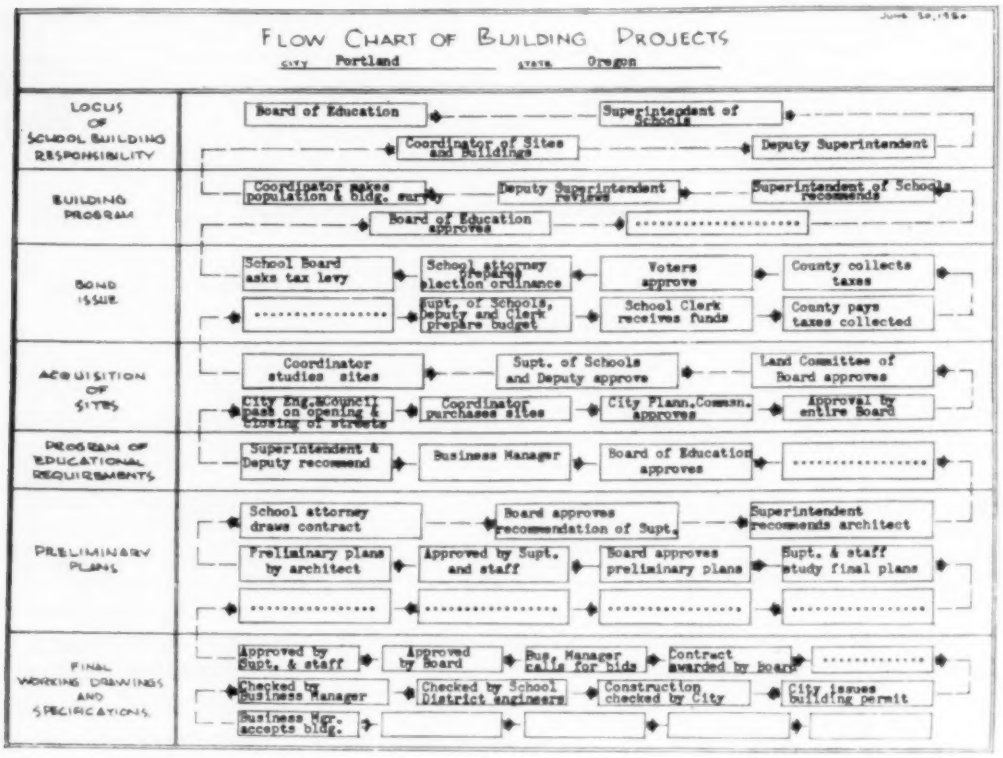
Organization in Other Cities

The wide variations in administrative machinery set up by law or regulation to carry out school building projects from their inception to completion suggest the need for simplification in many cases. Fiscal dependence of boards of education results in producing involved organizations and tends to build barriers to rapid movement of building projects. On the other hand, virtue does not necessarily reside in the simplest organizational forms. Here the ease of securing rapid action may result in ignoring factors to which attention would otherwise be called by an impeding authority. It must be recognized that the determination of a school's location, the choice of a site and the planning of the building have their bearing on the overall development of a community, and hence suggest the need for the utmost of community cooperation. The kind of organization that exists in a community will not assure success in the ultimate product if authoritarian processes are employed to the disregard of factors which make for desirable community growth.

Small and medium-size cities may have a distinct advantage over the larger city. In many such, as soon as financing issues have been resolved either through bonding decisions by the people or through official action by appropriating bodies, all decisions on site acquisition, programs of educational and community requirements, selection of planning personnel, preliminary plans and final working drawings and specifications rest on the shoulders of the board of education. The flow chart then takes a much more simplified form.

Then, again, the timing of an act or a decision spells a difference in the flow chart. This frequently results in loss of time or even in repetition of a service necessitated early in the process. For instance, the decision on financing may be postponed until plans are drawn. If costs are considered excessive by the controlling finance authority, it may become necessary to start planning again from the beginning.

Educational authorities initiating school building projects will find it helpful and certainly clarifying to construct their flow charts to show the regularized routinization of local procedures, as well as the variations when processes become stymied. The lay board member can then see at a glance the complete pattern of organization and the steps to be taken. Such an introduction into the intricate field of school building planning may well avoid costly or time-consuming work.



Flow chart for the city of Portland, Oregon. In this program it is the business manager rather than the board of education who accepts the building.

STAFF PLANNING FOR SCARSDALE'S JUNIOR HIGH SCHOOL



by WALTER F. FOGG

Dean of Junior High School Boys, Scarsdale High School, Scarsdale, New York

Mr. Fogg received his A.B. degree from Harvard University, and his M.A. from New York University. From 1952–53 he served as chairman of the staff planning committee for the Scarsdale junior high school. During 1953–54 Mr. Fogg has been acting principal of the Edgewood Elementary School.

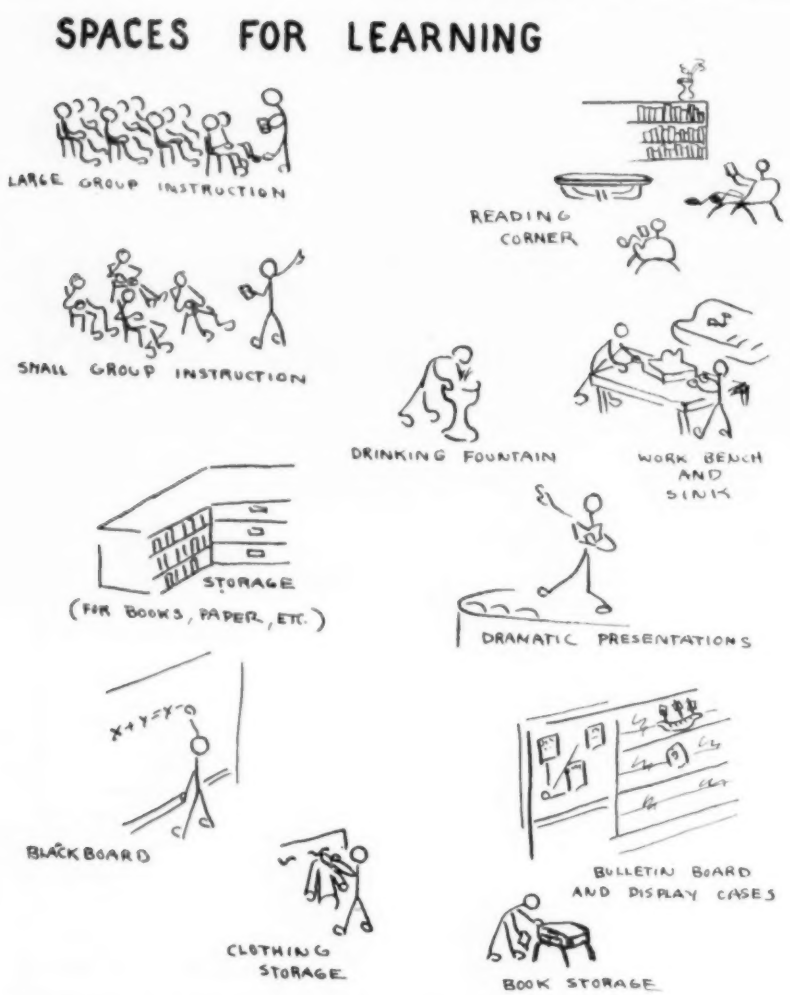
LIKE many other communities Scarsdale, New York, is expanding its school plant. An elementary school has recently been completed and in June, 1952, a Citizens Long-Range Planning Committee recommended the construction of a junior high school. Mindful of the limitations of time and the need for careful planning to meet educational needs of the district's children, the Board of Education in October, 1952, took the next step forward. It appointed a staff planning committee of seven Scarsdale teachers and administrators.

While it is frequent practice to engage educational consultants or university field groups to do the planning, it was felt that local staff members were best qualified to plan a school which would meet the needs of Scarsdale children. The committee was asked to study and make recommendations under the following broad headings:

1. *The Curriculum.* Considering the needs and characteristics of Scarsdale children in grades 6–8, and with due regard for the curriculum of grades K–5 and grades 9–12, what should be the curriculum, program and activities of a school housing grades 6–8?
2. *The Staff.* What staff would be required to meet the curricular, co-curricular, guidance and other needs in the proposed junior high school?
3. *Educational Specifications.* From a careful analysis of 1. and 2. above what are the activities, indoors and out, for which facilities must be provided?
4. *Community and Related Needs.* What are the probable demands on and desirable uses of the facilities of such a school by groups and programs such as P.T.A., scouting, recreation and the like?
5. *Services.* What are the service activities for which facilities must be provided? Eating? Wraps? Toilet? Parking? Meeting and other needs of staff? Office?–etc.
6. *Space Requirements.* From 3., 4. and 5. what are the numbers and general characteristics of spaces, indoors and out, which should be provided for 450–600 pupils? for 900–1,200 pupils?

The Report Is Prepared

The timetable required that the committee's report be completed and in the hands of the Board by April. Anyone who has participated in such a study will recognize that six months is a short time for the task when committee members are otherwise occupied. Two years would be a fairly common "par" for the course. The report was printed, illustrated and bound (42 double-column pages) on time. In retro-



These drawings were used to illustrate the final report distributed to the Scarsdale community by the staff planning committee for the proposed junior high school.

spect, some advantages of telescoping the time allotment are apparent. A close deadline tends to keep discussion from becoming random and tends to slough off side excursions which, while tempting, are not particularly constructive.

From the start we committee members tried to remember that we were educators, not architects. We were planning a program; it would later be the architect's task to provide the proper physical facilities to implement this program. Thus, we thought and spoke of "spaces" rather than "rooms"; and of group sizes rather than building dimensions. We stressed the "feeling" or "atmosphere" we wanted for a given activity, trying to be so specific that the architect could translate that feeling into materials and dimensions.

A few eyebrows were lifted when the superintendent had first proposed a grade grouping of 6–7–8. Very few schools in the East are so organized though there are several splendid ones in the Midwest, notably around Chicago. The committee began by studying this grade grouping carefully and concluded that for Scarsdale, elementary schools containing K–5, a junior high of 6–8, and a senior high of 9–12 are entirely logical educationally. As time goes on, this conviction has become stronger.

Focus Now on Curriculum

Once the basic organization had been approved, the committee felt secure in moving ahead in the areas of curriculum and organization within the school. The fact that no model existed in Scarsdale for such a school as we envisioned, while alarming at first, gave us the opportunity to plan without the restrictions sometimes imposed by existing habit and custom.

In organizing its attack on the problem the committee was mindful that it would be successful only to the degree that the new school met the special needs of Scarsdale children and the community. This implied that no school has ever been built elsewhere which, if transplanted to Scarsdale, would satisfactorily meet the needs here. On the other hand, the committee was eager to study practices and facilities in other educational systems so that no promising ideas or procedures would be overlooked.

Six Aspects of the Work

In general the work of the committee had six aspects as follows:

1. Study of the best available writings in the field of curriculum and school plant.
2. Study of the community of Scarsdale to dis-



A planning committee session is in progress. From left: Dr. W. Paul Allen, Mr. Francis J. Deyort, Mr. Archibald B. Shaw, superintendent of schools, Mr. Robert Almy, Mr. James L. Theodores, Miss Frances H. Smith, Mr. Walter F. Fogg and Miss Thelma Fitzgerald.

cover what cultural patterns might have implications for school planning.

3. Study of the physical, emotional and intellectual development of adolescent children.

4. Study of the special characteristics, abilities and preoccupations of Scarsdale children in grades 6 to 8. A study of records was made to ascertain the range of I.Q. and achievement of Scarsdale children in those grades. Questionnaires were used to determine the extent and type of activities they engaged in both in school and "outside."

5. Visiting and analysis of about 20 junior high schools in the East and as far west as Chicago (in comparable communities where possible), especially with regard to curriculum, plant, organization.

6. An attempt to answer the question—under what physical and psychological conditions does learning most effectively take place?

There was, of course, a final phase consisting of writing, illustrating and editing. All writing and editing was done by the committee; the drawings were furnished by members of the schools' art department. Printing was by a professional printer.



Special spaces for Scarsdale junior high school include a library, visual aids, homemaking, typewriting, teachers' lounge and shops.

Procedural Mechanics

Some of the mechanics of procedure followed by the committee may have some interest for those about to embark on a similar task. Seven members constitute a small group for a task of such proportions. Had there been more time, a larger committee might have been desirable both to lighten the load for each member and to increase the number of staff members who profit by such a study. However, a large committee can also be a cumbersome one, and with time so limited it seemed wise to rely heavily on the few rather than less heavily on the many. The report was intended as a guide rather than a blueprint. Participation in the planning will involve more and more staff members, citizens and even children as the project goes forward.

The committee met, as most such committees do,



This is a visual record of the planning background employed in preparing the committee report for the people of Scarsdale. Costs for this pilot study and report totaled $3,050.

on afternoons after a day of school and occasionally for a full day when school was not in session. The meetings which really broke the back of the job and paid the richest dividends in accomplishment were two three-day sessions held away from the school and outside the village. For these two sessions teachers left their classes to substitutes, and administrators let the paper work pile up on desks while the entire committee, bag and baggage, left town and set up working headquarters at a secluded country inn some miles away. A stenographer accompanied the group. These two sessions permitted a concentration of effort and a speed of accomplishment which would have been impossible otherwise. Under such conditions it is heartening to see how apparently irreconcilable philosophies within the committee begin to merge and how common agreement on basic questions is promptly reached. Particularly in the second three-day session it was noticeable that the committee was thinking as a single unit, and no longer as seven different individuals.

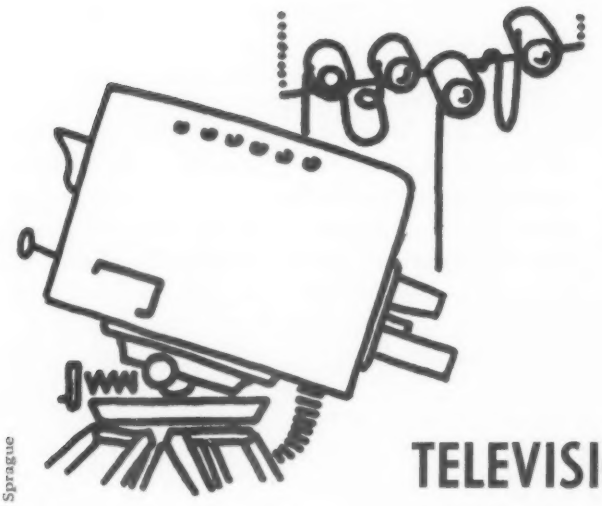
Costs of Committee Project

Costs to the Board of Education for this pilot study and report totaled $3,050 and include the following:

1. Transportation and other expenses involved in the visiting of schools. All committee members participated in this.
2. Payment of substitutes for teachers when their classes could not be absorbed in some other way.
3. Housing and food costs for the entire committee on the two three-day conferences.
4. The services of a stenographer for approximately a month's total time.
5. Printing the final report which was circulated throughout the school staff and to key persons in the community.

No doubt there were hidden costs such as the drain on the time and energies of seven people who were already assigned full teaching or administrative duties. On the other hand, committee members are unanimous in their recognition of the professional growth and stimulation which accrued to them and to the system from their efforts in preparing the report.

How well this committee has planned can be surely told in the years ahead when the building is completed and the program is in operation. But of one thing the committee is very sure; it is far better to plan a program and then build a plant to implement that program, than to build a plant and then tailor the educational needs of children to fit an architect's blueprint.



Sprague

TELEVISION'S ROLE IN EDUCATION



by LAWRENCE H. CONRAD

Chairman of the Committee on Television in Education, New Jersey State Teachers College at Montclair

Mr. Conrad received his A.B. and A.M. degrees from the University of Michigan. He taught English there for five years and then became head of the English department of the John Burroughs School in St. Louis. Since 1930 he has been at the State Teachers College at Montclair in New Jersey, where he is associate professor of English and chairman of the Committee on Television in Education. Mr. Conrad is author of several books and of numerous magazine articles. He is president of the Association of New Jersey State Teachers Colleges.

THE greatest boost that has ever come to commercial television is the discovery that it is an educational medium. Since this idea first dawned, early in 1950, the giant has awakened and has introduced, among many innovations, a rapid succession of program ideas devoted to the public welfare and designed to carry into the home a generous sampling of the knowledge, the lore and the culture of mankind. Since that date it has been the television industry, and not the educator, that has used the medium for the demonstration of working methods in industry; for the transmission of medical and surgical techniques—sometimes in color; and for making available to everyone the great moments of contemporary history.

The greatest demonstrations of the educational value of television to date have been the Eisenhower inauguration, which was perfectly immediate and perfectly contemporary—broadcast in the present tense; and the coronation of Queen Elizabeth II, broadcast from film but given the widest instantaneous distribution that any film has ever had.

These demonstrations affirmatively settle the question of whether or not regular, commercial television can render tremendous public service in education. Many newer programs reflect the realization of this truth. In the homes of the nation, in the universities and colleges and surely in the public and private schools, the great television networks will be able to offer contemporary history, art and science perhaps on a larger scale and in fuller measure than may be had through any other agency. The commercial sponsor, far from interfering with such a service, truly makes it possible on the grand scale.

Value of Commercial Television

Education should be utilizing commercial television and should be studying ways of taking greater and greater advantage of what is now available and

what the networks are willing to provide if only they are shown what is needed. If the schools awaken to the value of this facility they could, starting at the present moment, greatly enrich their offerings. Commercial television programs make an excellent supplement to the curriculum. Indeed, those seen quite by chance in out-of-school hours are already serving that purpose.

The commercial programs that bring knowledge to adults and training to tiny tots are extending the educational span in both directions from the mid-point of the public schools. The value of this service is already inescapable. It has just commenced; it is not yet organized; educators have scarcely taken it into account. In another five years, given some encouragement, this supplement might come to have a value equal to the present value of the main enterprise in education.

Yet it is a fact that commercial television has another mission and it cannot be expected to give more than incidental attention to supplementing the work of the schools. Educational work would call for extensive daytime service and would lay claim to the best of the evening hours. As education is a non-profit enterprise, no station could afford to give it so much. One authentic survey of every minute of broadcasting of seven New York stations for one week showed that no more than 3 percent of the time was given over to informational programs, such as would be required in any systematic program of learning. Though it is but a small portion of the total time, that 3 percent is an enormously valuable supplement.

We must not suppose that there were not in addition, other kinds of programs that have real value, but the commercial enterprise can take over only a modest percentage of the burden of public education. From within the industry itself the best estimate that can be made is that the educational programs now being broadcast from commercial stations are attracting only about 6 percent of the audience. Allow for a growth of this audience by whole multiples—and that should happen soon—and you would still need a greatly expanded plant in order to handle a significant part of the burden of education.

The Educational Channels

The calendar year 1954 should be a great turning-point in the advance of education; not alone because great issues of educational content and technique are being debated in public—with one eminent educator declaring that the whole present system is a failure—but also because the educational television channels this year are being put into operation in great enough numbers to provide a sound test of an educational aid that may be the biggest thing since books were invented.

There are 242 ultra-high frequency channels reserved for non-commercial television. In addition, some educational stations are already operating on commercial channels and others are planning to do the same. The great opportunity was provided by an order issued by the Federal Communications Commission on April 14, 1952. Up until June of 1953, the educational world was still seeking information on the operation and utilization of television equipment, and was studying the problem of raising the large sums of money needed to put education on the air in any effective way.

If 242 stations were to go on the air at once, there would be many more than the total number of stations now on the air serving all of the needs of the whole country. So it is probably well that progress toward the operation of this new facility has been slow. There are several different patterns of development that ought



Atlanta City Schools

"Our World Today" is a panel discussion program telecast each week by a local station in Atlanta, Georgia. The panel is composed of Atlanta high school students. The project is sponsored by the *Atlanta Journal* and the University of Georgia.

to be tried in order to discover the best way to make use of these channels in serving the whole range of educational needs to be found in each community.

Station Applications Are Filed

Up to December 1, 1953, four stations had actually gone on the air with a regular program of educational offerings. Even so small a number shows excellent progress. Forty-six applications have been filed with the FCC for permission to construct educational TV stations. To 26 of these applicants permission has been granted, and the work of providing the stations is in some stage of progress.

Many of the applicants for construction permits are state or city boards of education. Many more are colleges and universities. Quite a few are combined community groups, often bringing together a number of institutions of learning, sometimes both public and private and sometimes involving both a school system and other combinations of educational organizations. It is quite heartening to discover how many different kinds of organizations regard themselves as educational for such a purpose as this. No matter who operates the educational station, it must serve the whole community. That is required by law.



Philadelphia school children are participating in a local telecast. Schools must provide themselves with the necessary facilities so that they may avail themselves of services to be secured from educational television.

Jules Schick

The Programs Involved

Sooner or later the new facility will find that it must serve adult education groups and interests; the requirements of the colleges in the area; the schools, on all levels of instruction; the school population in out-of-school hours; and such advanced cultural requirements in the community as drama, music and art appreciation. All of this would divide roughly into "classroom" and "non-classroom" use, the great difference being that in the former a teacher is in attendance where the program is received; and in the latter reception is in individual homes and the program must make its own way and be fully self-contained.

Nearly all of the talk at the outset has been of programs beamed to the leisure hours of the adult population. There is a ready-made audience for such programs. In New York State alone there are 600,000 adults regularly enrolled in courses conducted by local boards of education in the public school buildings. Of course, there are millions more who are potential candidates for similar self-improvement courses, if the courses could be piped into their homes. Television simply could not take over these courses and these potential learners. Such students require a large number and a great variety of courses.

If television served no other group but this one, and if it operated from eight in the morning until midnight, giving a new course every half hour without a break, it could handle only 32 different courses per day. With such a schedule very few of them would come at just the right hours for the people who most wanted them. The television station, then, must study how best to serve the adult education program of the community by supplementing and enriching it; not by taking it over.

Supplementary Adult Education

This supplementation involves coming to know which parts of the adult education program can be handled best by television, and which are better left to "live" instructors; what special kinds of help can be carried via television to give extra stimulus, emphasis or vividness to something that must be brought into the course. Held down to such a supplementary role in adult education, the community station could render great service without devoting itself wholly to this one

Ostergaard



Students at Montclair State Teachers College in New Jersey become familiar with all of the equipment used in a television studio.

institution. It has to keep free for cultural and informational free-lancing during the evening hours in addition to serving those who are enrolled in organized courses. Both the classroom and the non-classroom audience have to be served.

There is ample testimony that we may expect much of television in all fields of education. Richard Hull, who has used the medium extensively at Iowa State College, says, "It will reach more citizens more often with more information . . . and with an impact the violence of which it is still difficult to appreciate fully."

Dr. Milton Eisenhower, in his masterly study of television's educational possibilities, speaks of its "remarkable versatility and educational effectiveness," and suggests that it will be used "where it is manifestly capable of doing a job more effectively or cheaper than is now possible with prevailing devices." Former Chairman Walker of the FCC declared, "No other device can carry such a volume of education and information to every corner of your state so efficiently and cheaply." A learned committee of the University of Chicago, after a sound study, says with careful restraint, "The committee believes that over the years there would come into existence a large body of consistent and conscientious viewers for whom television will have brought the ideal of lifelong learning much nearer to realization."

Programming for Schools

However, the major concern of the present hour is the question of what will happen when the time comes for operating within the public and private schools. The school day is never more than seven hours long. Even if programs were only a half-hour in length, leaving a part of the lesson always for the classroom teacher, there could still be no more than fourteen programs from a given station within the school day. These fourteen lessons would have to be divided up among the primary, the elementary and the secondary school grades—less than five programs for each of these large divisions—with no time left during school hours for any community broadcasting whatever!

Would we, accordingly, have today's lesson be music, arithmetic, nature study, handicrafts or spelling? On the secondary school level, some one of the six grades would go without a television lesson each day, while all others had but one lesson each. Few schools will be within reach of more than one educational television station, and no one station can supply more than a fraction of the instruction required in the various grades and fields of subject matter in any school.

Let us, accordingly, banish the thought of a school being taught by a television receiver and let us laugh off the fears engendered by such a thought. School will be enriched by the addition of television. The problem is to discover where the device can contribute most, how it can best be used, and what adjustments it may bring about in the total process of public instruction.

Non-commercial television can best serve education, it would seem, by:

1. Devoting its major effort to serving those who are regularly enrolled as students in schools and colleges.
2. Studying the problem of the use of television equipment in the performance of this one major function.
3. Seeking to supplement the offerings of commercial stations and, in turn, using commercial programs as supplementation to the education-centered productions.

Types of Programs

In view of the limited fraction of school time which can be filled by television broadcasts, it becomes important to discover what types of programs can fill the time in the most efficient and economical manner. Out of hundreds of suggestions that have been offered, here are a few that emerge as worthy of some systematic experimentation:

1. Use television to present one "master lesson" in each unit that is to consist of a dozen or more lessons.
2. Use television for such occasional laboratory demonstrations as require expensive apparatus or a complicated and difficult technique calling for a skill that is rare among teachers.
3. Use television to bring to the whole school, now and then, a first-rate personality to dis-

cuss his specialty, instead of engaging for assembly programs the third-rate people who travel from school to school for a small fee.

4. Use television to show scenes and sequences not available without expensive travel and to exhibit items that are rare or precious, or that may not be handled without personal danger.
5. Use television to bring great teaching, when it may be had, to students who do not experience it often enough on their home ground.
6. Use television to bring the contemporary world into the school.

Some of the above purposes could be accomplished by utilizing commercial programs regularly available. No school is ready to be served by any special educational channel that has not already made some use of the often excellent broadcasts now offered.

Much of what is suggested above would require an agency with a budget and with facilities for broadcasting specially planned lesson material into the schools. The program—so far as the schools are concerned—must be found within the present curriculum. Some of the tasks the schools have undertaken could be handled no better, it may be, by television than by the present or the time-honored method. Among school subjects, activities and units of work, some will be found which lend themselves well to television treatment. These, that can be presented better via the TV screen, will suddenly become capable of wide and instantaneous distribution, and of such vivid and compelling treatment as to insure swift learning and longer retention. This, in the long run, means better and cheaper education, even if only a fraction of the curriculum can be so treated.

The Facilities Needed

The fundamental piece of equipment needed to bring any school into the orbit of educational television is a receiver. Any school within the broadcast area of commercial television ought to have a "set" as a part of the equipment of the building. The proper size for a classroom is probably the 21-inch screen. The cost of such a receiver is about $250. One is enough until the school is in a position to make use of more. The receiver is probably best kept in one room with classes brought in whenever there is a program with special appeal to the interests of a particular class.

Such school equipment should be multiplied only when increased use by more and more classes brings educationally gratifying results. When, in the course of the next few years, the educational channels come into steady use, the schools will require more receivers. No single school will have to maintain a broadcasting station now or at any time. The school, as such, is on the receiving end of this great enterprise.

However, the educational world, working cooperatively with various groups and agencies within the community, has a gigantic task of organizing, building and planning, before educational television becomes the great force for public service that it can certainly become. Educators in each of the states—indeed, in each community—must see that the needed steps are being taken to secure the facilities for independent broadcasting of educational programs for the benefit of the whole population of the area, including colleges and schools.

The Broadcasting Station

The central facility, a broadcasting station, is very expensive. It may cost from $250,000 to $300,000, depending upon what is available in the way of housing and preliminary equipment. Its maintenance as a full-time facility will cost another $150,000 a year. Stations that have set themselves up in business thus far have raised this money from a number of sources, not from any one source. State boards of education that have presumed to take charge of the educational television interests of a statewide area have not, as yet, seen their legislatures come through with an appropriation of funds to build a single station. Those legislatures may eventually appropriate money for the purpose, but they certainly have not acted yet.

Dumont



Educational TV requires a concentration of people and equipment.

Any television broadcasting station that is likely to be built will have a hundred or more schools within its broadcast range, and will expect to serve them during some part of the broadcast day. While it is true that a single station can serve only a fraction of the needs of a school and can fill up only a fraction of the class periods with specially tailored instructional units,

it is also true that there are ways of increasing the advantage enjoyed by schools that are provided with the basic equipment.

What Schools Can Do

First, any given school system can provide itself with one central antenna to catch the programs, and then can connect all of its schools by cable so that lessons and other broadcasts received at the one point are made available throughout the system. The addition of a small, modified transmitter would make a closed circuit out of such a school system. In addition to the programs received from outside, any one of the schools could originate educational programs in its classrooms or laboratories and send them over wire to all the other schools in that community.

Over such a circuit twice as many hours of educational television could be provided; in fact, the local school system could keep the screen alive during most of the periods when the broadcasting station might be forced to leave it blank. Moreover, with a closed circuit of its own, any school system or collegiate institution could have an effective "talk-back" within its own area by means of which students in any of the receiving classrooms could, via microphone, ask questions of the instructor who could answer before proceeding with the instruction.

Second, by the use of a community antenna system schools, clubrooms and even homes in a remote area can pick up and amplify the weak signals of a station beyond the mountains, and thus provide good educational service to a whole community that is actually out of reach of normal broadcasting facilities. Moreover, by means of the community antenna it is entirely possible for a given community or school system to gain access to the broadcasts of more than one educational broadcasting station, thus insuring the variety and the choices in program material that make for ampler and more suitable fare.

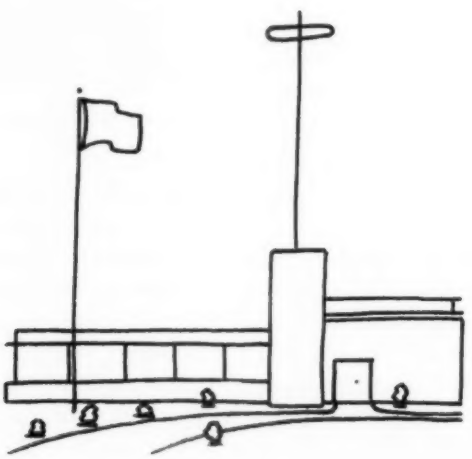
Any school system which participates in the planning and the program of one educational station, is provided with its own internal television through a comparatively inexpensive closed circuit system, and which has access to one or more additional channels by means of a community antenna, can be considered well equipped. All of the regular programs of commercial stations may, of course, be brought in on the same sets. These stations would surely begin, once the audience was assured, to direct special daytime programs to the classrooms of the nation.

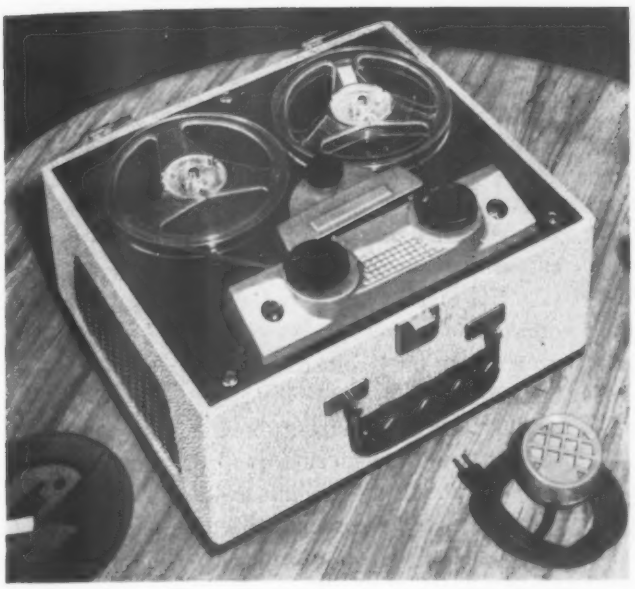
Teacher-Prepared TV Lessons

Great numbers of the nation's schools will, during 1954, have the experience of using some lessons prepared by teachers for broadcast presentation and will also use enriching supplementary material received over the same channels. A great many college and university classes will be taught via television, both within the colleges and to students in their homes. The U.S. Office of Education declared in November, 1953, that college degrees will undoubtedly be available by means of such courses before long.

Organized adult education courses can double their enrollment simply by extending the instruction to homes of the community. A tremendous increase will surely occur in all self-improvement training that is undertaken by individuals in home-study efforts, since these people can be aided more readily by purposeful broadcasts than can any other group.

Many millions of people can be reached so promptly and so constantly by this method that, in spite of the staggering initial costs, it is altogether likely that, even in its initial year, educational television will be the cheapest form of education ever provided. In subsequent years the cost will shrink still more. There already has been ample demonstration that it is one of the most effective methods of teaching ever developed.





TAPE RECORDING IN THE CLASSROOM



by ANTHONY R. LANZA

Audio-Visual Director, Central High School, Valley Stream, New York

Mr. Lanza holds B.S. and M.A. degrees from the School of Education, New York University. He has taught at the Union City, New Jersey, High School and at New York University prior to his present position. Mr. Lanza is co-author of the text, *Tape Recording in Business Education* and is a contributing editor of the *Journal of Business Education*. He has contributed to many professional publications.

THERE is probably no teacher in any school in the world who could not put a tape recorder to good use sometime during the school year. To mention more than a few of the possible applications of tape recorders would require many pages. To write in detail of the many future possibilities would be an endless task. The future of the tape recorder in education depends upon the imagination of the teachers who will use it.

As the use of the tape recorder grows, it will be mentioned more and more often in audio-visual textbooks and magazines; and as the demand for utilization in specific fields of study increases, interested specialists will plan and write of its applications at subject matter levels. For instance, there has recently been published a small teacher-training textbook entirely devoted to the uses of tape recording in business education. It may seem that application in the teaching of business subjects is a far cry from the obvious uses of recording devices for speech, music and dramatics. However, dozens of uses for tape recording in business education classes are suggested in that book.

In science, history, agriculture, physical education and, in fact, in all subject matter areas we will find increasing information on specific applications of the tape recorder. In general, however, present classroom applications may be divided into three major areas: teacher prepared recordings; student prepared recordings; and recordings prepared outside the school.

Teacher Prepared Recordings

Teachers may be expected to record only when the job is too difficult or too complicated for a student. The preparation of various tests on the tape recorder must necessarily be done by the teacher. In completed form a recorded test would sound very much like a radio quiz program. It provides variety from blackboard or duplicated tests and can be a great time-saver for the teacher. Of course, its use is somewhat limited to short answer true-false or completion type questions. The old-fashioned spelling bee on tape is a favored method of recorded classroom drill.

There are school systems which require an unusual type of teacher prepared recordings. Each teacher in the system records a typical classroom lesson for use in the event of that teacher's absence. With this "fill-in lesson" on tape a substitute teacher can present

a meaningful lesson at the turn of a switch. The tape recorder allows the absent teacher to be in two places at the same time.

In some ways a tape recording is like a mirror of oneself, and teachers will find that playing back a recorded lesson affords an opportunity to criticize teaching techniques. It can make a teacher aware of procedures that are highly successful and allow for emphasis in those areas. Its usefulness in self-analysis is a primary advantage of the tape recording.

Silent filmstrips and silent moving pictures are given new life through the addition of tape recorded sound. The teacher who has been accompanying the viewing of these silent projected aids with an extemporaneous talk knows that the results vary from day to day or from one class to the next. More often than not, when there is no preparation points are omitted. Sometimes a printed script may be read by the teacher or one of the students, at which time the difficulty of reading in a darkened room presents problems.

Compare these haphazard procedures to flashing the picture on a screen, turning on a prerecorded taped narration and then sitting back confident that the viewing will take a definite number of minutes and that it will cover an exact number of points. The teacher who has planned, rehearsed and recorded the narration is the one who will give most to his students.

Student Prepared Recordings

Student prepared tapes may be used for self-analysis and correction of speech, musical skill, typing rhythm and dramatic presentations. Recording English compositions so that the student may hear what he has written is still another means of analysis, not only of his speech but of his writing ability. Just as a teacher keeps an exceptional paper to use year after year for classroom display and discussion, so the tape-recorded presentation may be preserved and played endlessly.

Out of the classroom the tape recorder becomes a part of extra-curricular activities. Dramatic coaches and student directors of school plays have found the tape recorder an ideal tool for training student actors. As a medium for publicity, tape-recorded announcements are broadcast by educational radio stations and over the public address systems of schools everywhere.

The writing of interesting and stimulating announcements is a challenging project for any student group. A tape recorder makes it possible to rehearse, preview and correct presentations before an announcement goes on the air.

School cheerleaders can hear themselves and practice their cheerleading techniques, develop their lung power and rhythm.

Presiding officers of any school group may record a meeting to check on parliamentary procedures so they may improve their meetings. The uses to which the debating team or the music club may put the tape recorder are obvious.

Recording Outside the School

Because school is preparation for life, one of the most effective of all teaching devices is to bring outside activities into the classroom for analysis and discussion. It is not always possible for a guest speaker to take the time to visit a school and speak to the children period after period during the day. However, even a very busy celebrity, public official or successful businessman will devote the time it takes for one tape-recorded interview or oral presentation.

Students are given the opportunity to hear from people through the medium of the tape recorder and, in a sense, the recorder brings the outside world into the classroom. While recorded trips outside the school can never be as effective as field trips, neither do they require the planning, time, effort and expense of field trips. For a few dollars the same roll of sound tape will bring welcome people and places into the classroom for many visits.

Broadcast speeches and historical events, which seldom take place exactly when the teacher would like to use the radio in the classroom, can now be recorded as they take place, to be preserved for use any time the teacher desires. Recorded radio broadcasts remain as stimulating and as vital on tape as they were at the moment of recording.



Silent filmstrips are accompanied by tape recorded sound for more interest.

English teachers can record a radio presentation of a great drama and save it to be used over and over. In the past, of course, if a teacher was fortunate and the time was right, that radio presentation could be used in class only once. History teachers can build tape files of presidential talks, other vital speeches and of historical events. Music teachers may record operas and concerts; language teachers may pick up foreign

language broadcasts; and science teachers can capture on tape significant scientific dramatizations and discussions.

Thus, the tape recorder multiplies the value of commercial and educational radio for classroom use. This is not yet in wide practice but one foresees the day when there will be an exchange of tape recordings between school groups in various cities, states and eventually between our country and other countries all over the world, in much the same way as the exchange of letters is carried on at present.

Tape Libraries

In response to the ever increasing usage of tape recorders in the classroom there have been established, in some 20 states, tape libraries that will record selected programs for distribution to interested users. These libraries maintain master tape recordings of educational radio broadcasts. Tape recordings can be found in almost any area of education.

The programs vary in length from fifteen minutes to many hours for a whole series. It is not uncommon to find a selection of five or six half-hour tapes which represent months of radio broadcasting. English teachers will be especially interested in the professional performances of the great classics that are available. Social studies teachers will enjoy the realism of bringing "on-the-spot" programs into the classroom.

Some tape libraries are operated in conjunction with film libraries; others are under the auspices of universities. Occasionally, the master recordings are in the hands of commercial distributors.

The manner of procuring a prerecorded tape depends upon the organization from which it is requested. It is sometimes possible to merely order the program, indicating the make and speed of recorder and sending approximately $3.50 for 600 feet or $5.50 for 1,200 feet of tape.

Some organizations operate on a small service charge of 50 cents. Send them a blank tape and they will transfer any program desired to the tape and return it. This procedure is remarkably inexpensive because the prerecorded program can be erased after use and the tape returned to the library to have a new program recorded. For an original investment of about five dollars a teacher may bring into the classroom an endless number of excellent prerecorded tape programs.

Tape Recorders as Audio-Visual Aids

Despite the versatility of the tape recorder we must not make the mistake of overrating it, as we have the motion picture, in the classroom. For years the mention of audio-visual aids has meant motion pictures to most teachers. It would be unwise now to emphasize the tape recorder so that it too is expanded out of proportion to its real possibilities of use.

We must realize that teachers have always been the center of audio-visual instruction with some credit given to the assistance of the chalkboard, the bulletin board, classroom visitors, field trips, textbooks, moving pictures, radio and disc recordings. Television is omitted from this listing, for it must be admitted that educators have as yet done little more than touch upon the possibilities of television in teaching.

In recent years there have come into the field of audio aids two unique instruments that deserve to be considered apart from those listed above—wire and tape recorders. Both of these machines are available as portable, one-unit recording mechanisms that magnetically record sound on either wire or tape. They are simple to operate and economical to use. To erase a wire or tape and reuse it only requires running the wire or tape through the machine to demagnetize it.



Recordings can be made from discs to tape and also from tape to discs.

These recorders are similar but they do not enjoy equal popularity in the schools of the nation. A wire recorder does not achieve the fidelity of a tape recorder. A break in the wire means that the loose end may be buried in the spool, often requiring hours of search for the end, sometimes without success. If the broken end of the wire is found, it is knotted into the spool and some of the recording may be lost in the joining.

On the other hand, when a tape breaks it may be spliced, without any loss of recording time, by backing the break with a piece of mending or splicing tape. It is possible to purchase recording tapes with paper base or, at a slightly higher price, with plastic base. The difference in price is more than made up in the quality of the plastic tape which seldom breaks and which offers smooth editing and excellent fidelity.

Professional recordings on radio and television are made on tape recorders. The faster the speed at which a tape is recorded the better the fidelity of the finished recording. Professional recordings are prepared

at speeds of fifteen or more inches per second, while educational and amateur recordings are prepared at speeds of seven and one-half or three and three-fourths inches per second. For average classroom use the latter speed has definite advantages, the major one being that at lower speeds there is a lower consumption of tape. It follows that lower-speed recording is, therefore, less expensive.

In instances where better fidelity is required, as in music and speech classes, the seven and one-half speed is usually adequate. There are available a number of tape models that offer both recording speeds. These models are not more expensive than other recorders and yet offer the obvious advantage of greater utilization.



The recorder's earphone attachment is used here for shorthand practice.

Purchasing the Recorder

The purchase of a tape recorder deserves a careful investigation of what is available. There are twenty or more well-known manufacturers producing tape recorders today, any of which might be successfully used in schools. However, the tape recorders should be able to meet particular needs.

It is for the user to decide on push-button control, for instance. Will there be adequate need for a radio-tape recorder combination? Is there preference for a radio adapter that will pick up without interference from an outside speaker? Perhaps the recorder should have an output to which may be attached earphones for private listening and editing. If it suits the school's need, the tape recorder might also be used as an office transcribing machine. In this event the recorder should be one that can be operated with an on-off foot pedal control. What about the portability of the recorder? A good school weight is from 30 to 35 pounds or less. Can all the qualities desired be found in a machine of that weight?

The tape capacity of a machine is an important consideration. The purchaser must determine whether it is desirable to use a five-inch reel or a seven-inch reel of tape on the machine. Ordinarily, the larger capacity recorder is preferred. A few minutes of investigation will result in an adequate realization of the potential of any tape recorder.

In the final analysis any equipment is only as good as the uses to which it is put. The purchase of one or two tape recorders does not thereafter assure their use. Teachers must be informed about what has been accomplished with tapes and they must be encouraged to experiment with new techniques. This process has been a slow one where other audio-visual aids are concerned. However, if the purchase of tape recorders for school use continues at its present rate, a prediction that the number of tape recorders in schools will, one day, outnumber moving picture projectors will be realized.

LABORATORIES FOR LEARNING

by N. L. ENGELHARDT, JR.

Member of the Firm of Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

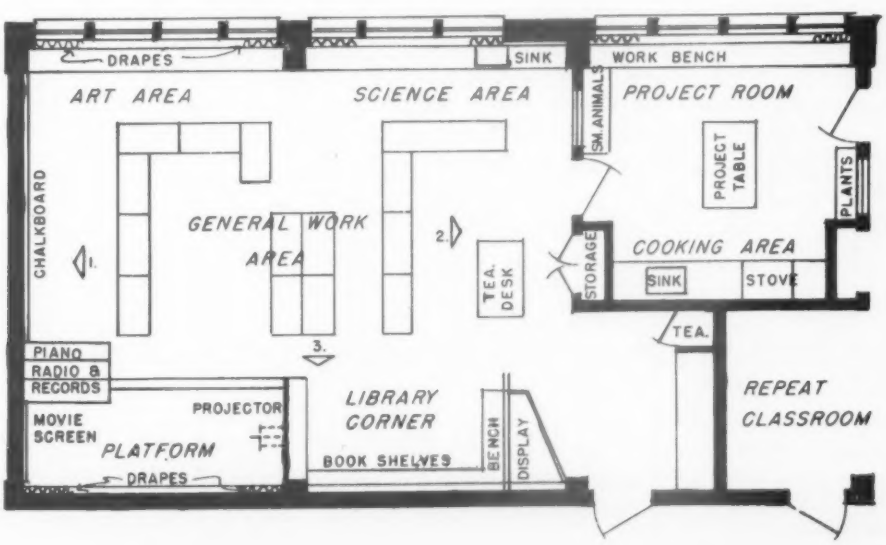


Dr. Engelhardt is a graduate of Yale University and received his M.A. and Ph.D. degrees from Columbia University. He has had a long and full career in education. His positions have included member of the staff of the firm of Harrison & Fouilhoux, Architects, research associate, Division of Field Studies, Teachers College, Columbia University, director of research, Newark Public Schools and professor and lecturer at the University of Wisconsin, University of Florida and New York University. Dr. Engelhardt is author and co-author of many books for educational administrators.

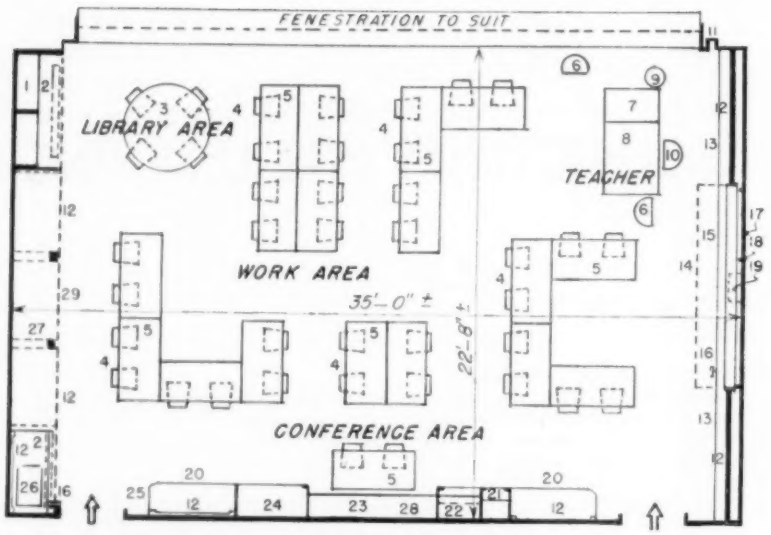
DURING the years since 1940 communities the country over have been building elementary schools, striving to meet steadily rising enrollments. Now, with that job still far from finished, they are on the edge of a pressing demand for new secondary schools.

What characteristics will these new secondary schools take on? What kind of educational program will they house? Who will be taught in them? To what extent will these schools be planned to serve the whole community? Will they include provision for school camps? How can communities economize in the erection of these new schools yet guarantee boys and girls full educational opportunity? Will the school year or the school day or both be lengthened? If so, what additional opportunities will result? How can building adaptability and flexibility be assured so that the building itself and its facilities will not hamper the growth of coming generations of teachers and pupils? What does general education include? Around what basic purposes shall it be organized? How can secondary schools help pupils acquire vocational competence, independence of action, ability to get along with others, civic responsibility, good health?

It is clear that these questions, and others, should be answered to the best of our ability if we are to avoid planning schoolhouses which might otherwise soon be obsolete in terms of the growing demands of program and changing techniques. Out of the complexity of high school organization the classroom and the laboratory still remain as the core of the learning program. They also remain as the fundamental units of organization of the school. What should this core be like in a modern high school? What are the requirements for these laboratories for learning, and how should they be designed to help the student and



Here is a laboratory for learning at the elementary level. Division of area includes spaces for art, science, general work, display, cooking, a library corner and a platform for stage presentations.



A classroom laboratory for junior high schools. Legend is at right.

NO.	DESCRIPTION
1	Bookshelves and Magazine Rack
2	Concealed Overhead Lighting
3	Round Table, 4'-0" Diameter
4	Pupils' Chairs
5	Pupils' Tables
6	Side Chair
7	2-Drawer File Cabinet
8	Teacher's Desk
9	Waste Basket
10	Desk Chair
11	Recessed Inter-comm. Telephone
12	Display Board, Cork
13	Storage Cabinets
14	Shadow Box, Portable
15	Chart Cabinets
16	Duplex Receptacles
17	Projection Screen
18	Sliding Chalkboards
19	Loudspeaker
20	Supply Cabinet and Shelf
21	5" Deep Cabinet
22	Teacher's Locker
23	Built-in Seat, Storage Under
24	Display Cabinet, Cupboard Under
25	3" Classroom Bell
26	Sink, with Work Counter, Cabinet Under
27	Pupils' Wardrobe
28	Wall Mural
29	Chalkboards on Wardrobe Door

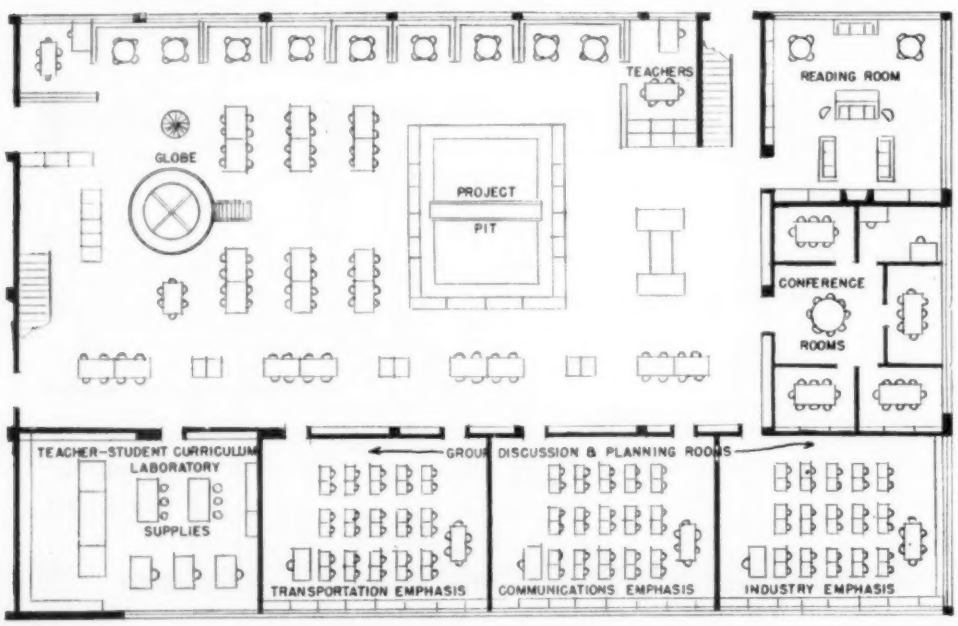
teacher to pursue learning activities most successfully?

The Subject-Matter Classroom

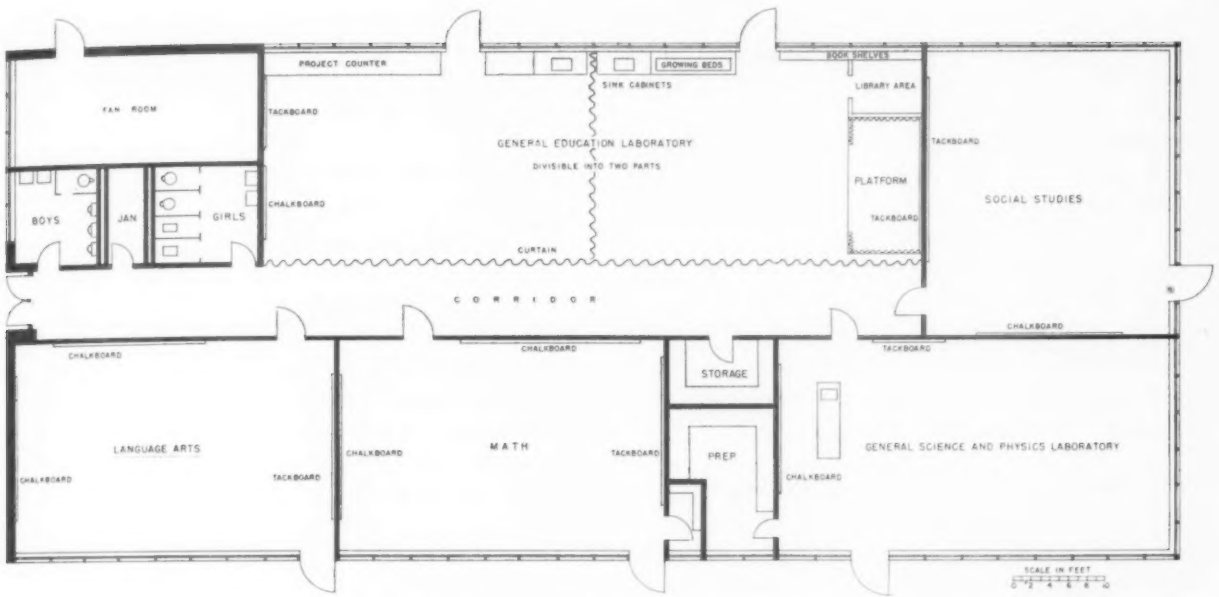
The methods by which individual subjects have been taught have established traditional types of spaces. The sciences have been taught in the science laboratories, ranging from simple units of general science to laboratories of greatest complexity for chemistry and physics. Art has been carried on in specially-designed units to accommodate various activities usually associated with drawing, painting and craftwork. The languages and, in many cases, social studies and mathematics have been taught under the textbook-recitation system, requiring only the simplest type of classroom spaces.

In recent years as teachers have moved forward in the improvement of the learning situation, the demand for facilities beyond recitation and reading has come into all subject-matter areas to the point where the traditional recitation room is not satisfying the needs of students and teachers. The trend is clearly in the direction of more complete facilities for all subjects, gradually approaching a common type of laboratory space which draws upon all skills and all forms of expression in any given learning situation.

Laboratories to serve programs where subject matter has been fused, properly demand greater variety of equipment and facilities than in any other case. Where



Another approach is suggested by this large laboratory for 150 students. Featured here are a reading room, conference, group discussion and planning rooms, a curriculum laboratory and a general area.



This unit for 150 is at the Senior High School, Groton, Connecticut. Architect for the building is Warren H. Ashley; Engelhardt, Engelhardt and Leggett, educational consultants.

science, art, social studies, mathematics, the languages and the crafts come together to be utilized in a total problem as a complete and integrated activity for learning, it is clear that all the facilities necessary for carrying out the work in all of these areas should be available in the laboratory.

Essential Facilities for Learning

The design for a laboratory for learning which should encompass a large number of activities depends on two principal factors: one, the organization of the group, including size of the total group as well as of its component parts; and, two, determination of the facilities which are common to all areas of instruction. It should be possible to design a learning space that will serve needs as different as those of mathematics and art, of music and science.

What facilities are common to all areas of instruction and, therefore, should be found in an adequately equipped area for learning? An answer to that question can be found by examining the kinds of activities in which pupils and teachers engage in secondary schools, oftentimes in spite of facilities ill-suited to their purposes.

They Communicate

Whatever the subject—mathematics, science, foreign language, art or home economics—communication through spoken and written language is essential. Consequently, the learning area must include writing surfaces (not necessarily desks), chalkboard, display space for charts and graphs and illustrations of all kinds, a tape recorder and, most important, generous space for conferences of all types, for the private counseling of an individual student by one teacher, for meetings of student committees, for class-size groups and for several classes meeting together. Since communication is most effective and most satisfying when people can talk face to face, the learning area will be equipped with movable furniture which can be arranged to fit the needs of the moment.

They Carry on Research

Whatever the subject, if students are really interested in it, reading about it in a single textbook will never be enough. If students are to proceed with the solving of real problems and if their varying abilities are to be recognized, then a variety of research materials must be available. Consequently, every learning area will contain newspapers, magazines and reference books.

They Work with Their Hands

Boys and girls learn through a variety of experiences. For one student reading makes a particular concept clear; for another, seeing a filmstrip is more helpful; while still another will benefit more through constructing a model or painting a picture. Moreover, the developing imagination knows no subject boundaries. Problems in mathematics and science, for example, may stimulate desire for expression in line and color just as much as the formal problems presented in the art room.

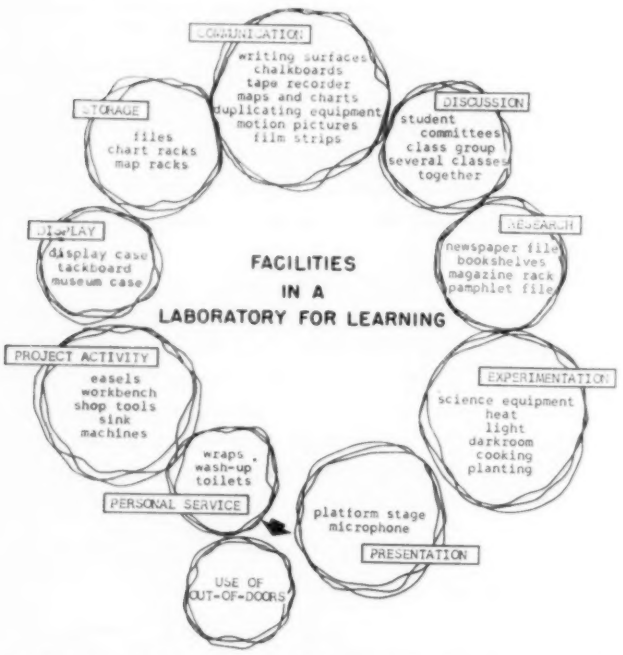
As a matter of course the learning area will contain many media for construction and for graphic expression. Simple woodworking tools, paints, clay and craft materials will be found there, with a workbench or work counter on which to use them. Thus learning can proceed easily and naturally. Suppose, for example, that a group of students has finished the read-

ing of a drama. Some will wish to express their reactions by designing a stage setting, by illustrating particular scenes or by fashioning appropriate costumes. Under usual conditions they must "invade" the special departments of the school—the art room, the shop, the home economics department—where their presence causes additional problems for the already busy teacher.

Too often the attendant difficulty in this kind of procedure leads to student frustration and, ultimately, to lack of interest. Such a procedure certainly violates the principle of readiness in learning. Does it not seem more sensible to bring the learner and the essential materials together in a suitable space so that the normal sequence of learning may proceed?

They Carry on Experiments and Hobbies

In science laboratories, on the school grounds and frequently in their own homes, boys and girls of secondary school age carry on experiments with all



The facilities which compose a laboratory for learning may be classified into nine categories, and also use of the out-of-doors.

kinds of growing things, with fabrics, furnishings and food. They have hobbies of all kinds. Photography is of particular interest. An adequate area for learning will give recognition to the value of these activities and will include facilities for them. A sink, laboratory equipment, a stove, a darkroom and plenty of electrical outlets are needed.

They Display the Products of Their Learning

And when the jobs have been completed—a three-dimensional model illustrating a mathematical principle, a chart to aid the understanding of inflation, a mural with the United Nations for its theme—it follows that they must be displayed so that others may share and learn. Some are suitable for exhibition in the display cases. Others are mounted on the tackboard within the room.

They Present Their Findings to the Group

When a problem has been solved or when a unit of work has reached its culmination, space for demonstrations and for presentation of findings will be needed. Some reports take the form of debates and panel discussions. Some are dramatic skits. Some consist of a tape recording played for the student audience. At these times a platform stage is useful, aiding in the creation of an audience situation without the delays and other disadvantages involved in using the school auditorium.

They Use Much Storage Space

Some of the products of student effort, certain of the displays and models, for example, will have value at a later date and so there is need for storage space. In fact, a variety of storage space is essential in every learning area.

They Use the School Grounds for Learning

There was a day when the presence of a class on the school grounds during the school day was cause for comment and question. Today, however, teachers and students are encouraged to use the entire offerings of the school plant. Learning extends beyond the classroom door.

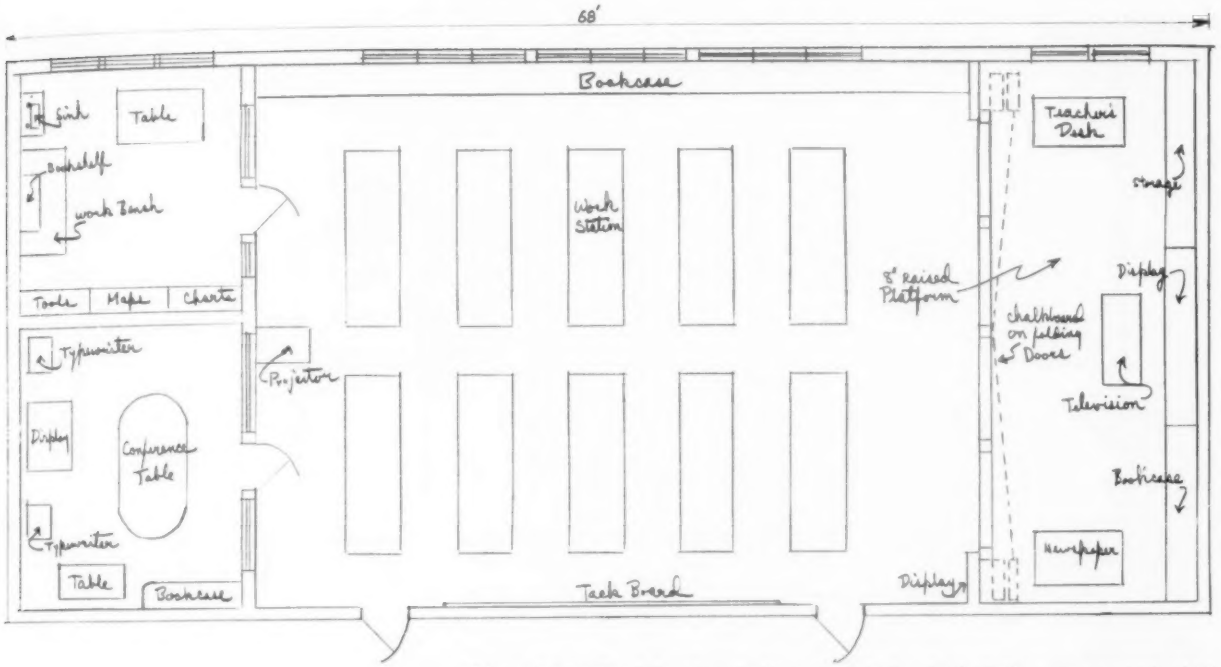
Group Organization

There appears to be greater need for provision for large and small groups, especially under the fused program, than has been customary in the past. The operation of class committees creates a need for spaces for conference work and for various types of activities for groups of from three to eight or so students. At the other end of the scale there is the wish to bring together class groups having common problems, the result being that in some cases it appears to be highly desirable to organize the total activities around a group of from 100 to 150.

The Laboratory for Learning

One proposed laboratory would include a large all-purpose room (1,500 to 2,000 square feet) with a simple platform stage, sinks, work counters and display and storage space. Around this area smaller spaces would be grouped, each accommodating a particular phase of instruction.

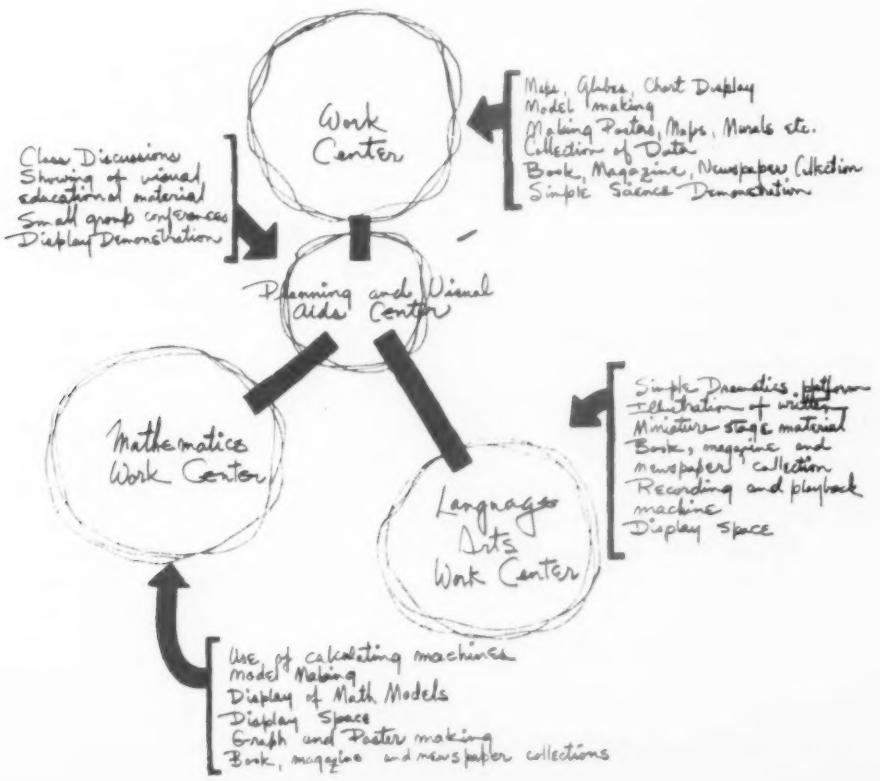
In a senior high school of 1,200 pupils there might be four of these laboratories for general education, each serving about 100 pupils for about two hours of each day. Three or four teachers working as a team



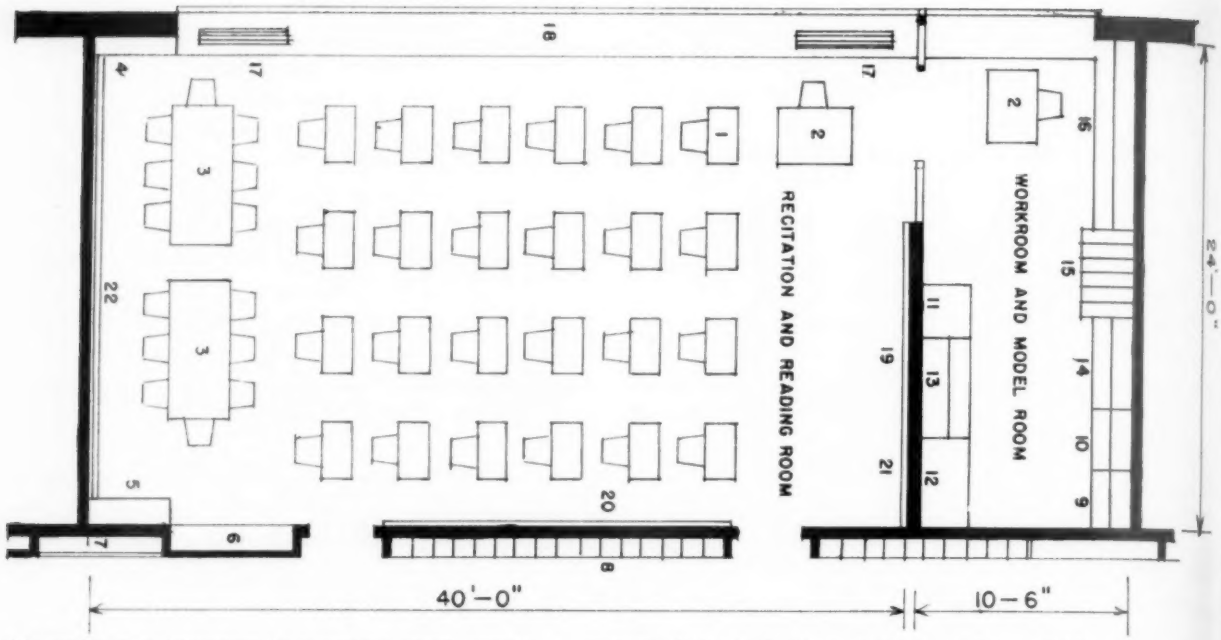
This social studies laboratory features an 8-inch raised platform at one end which can be shut off from the main area with folding doors finished with chalkboard.

would combine their talents, more in the role of guides and counselors than directors or lecturers. Whenever desired, the entire group could come together in the all-purpose room for planning, consideration of common problems or for the enjoyment of social activities. The adjoining spaces could be used for conferences, for small group activities, for research, for recordings, for viewing slides and films and for the more formal or remedial type of instruction.

One group of teachers from the Hagerstown,



A comprehensive learning laboratory will have facilities for various kinds of activities. It is possible for a mathematics work center, a language arts work center, a planning and visual aids center and a general work area to be found to accommodate particular phases of instruction.



This mathematics laboratory for secondary schools contains: 1. student's desks; 2. teacher's desks; 3. conference tables; 4. newspaper racks; 5. bookcases; 6. museum case; 7. display case; 8. lockers; 9. tool case; 10. model case; 11. teacher's locker; 12. chart file; 13. cabinets; 14. instrument case; 15. vertical file; 16. bookcase; 17. heating unit; 18. storage; 19. chalkboard with cases underneath; 20. chalkboard; 21. spherical chalkboard; 22. display board.

Maryland, Senior High School, outlining the needs of such a laboratory, listed the following facilities as being desirable:

a. Display cases.
b. Chalkboards in each room and in common room.
c. Cabinets for map and chart storage.
d. Open and closed shelves.
e. Electrical outlets.
f. Permanent projection screen.
g. Movable chalkboard.
h. Cork display boards in each room and in common room.
i. Built-in television, radio, tape recorder and three-speed playback, plus storage space.
j. Aquarium.
k. Loud-speaker, intercommunication system in school.
l. Recessed intercommunication telephone.
m. Work area and sink.
n. Sturdy work unit in industrial work areas.
o. Built-in seats, storage under them.
p. Storage units in each classroom.
q. Spherical chalkboard.
r. Platform.
s. Typing and duplicating equipment.
t. Small storage space per student.

Activities Carried On

Perhaps the educational possibilities of these spaces can be made clear by looking at some of the particular activities which might be carried on in them. Suppose, for example, that eleventh-grade students are engaged in community planning. Consider for a moment the many kinds of jobs to be performed in really planning for one's community, not merely verbalizing about it. Information will be needed about the community as it now exists.

As they set about gathering the information, students will very likely prepare and distribute questionnaires. (Typewriters and a duplicating machine are needed.) They may decide to conduct a survey. Student photographers will go to work. (A darkroom and developing equipment are needed.) As data are collected, it will be organized on slides, charts, graphs and maps. (A slide projector, easels, art supplies and plenty of elbow room are needed.)

Some students meanwhile will be doing research to discover what the community was like in the past. Their findings will be material for dramatic skits and recordings. (A simple stage and recording equipment have their place here.) One of the culminating activities may be the construction of a three-dimensional model of the community or sections of it, as it might appear in the future. (Woodworking tools, paints, clay, metal and plenty of unencumbered work space are required.) Reports and newspaper stories will be written.

Only in rare instances have school facilities been deliberately planned to make possible this kind of approach to learning.



Business machines of all kinds are an integral part of the business world. A knowledge of these machines is good background for business education students.



EQUIPMENT FOR A BASIC BUSINESS EDUCATION COURSE

by M. HERBERT FREEMAN

Business Education Department, New Jersey State Teachers College at Paterson



Dr. Freeman received his B.S., M.A. and Ph.D. degrees from New York University. He has been professor of business education at Paterson State Teachers College since 1943. He also taught in high schools of New York and New Jersey. Dr. Freeman has been a visiting professor at many universities throughout the country.

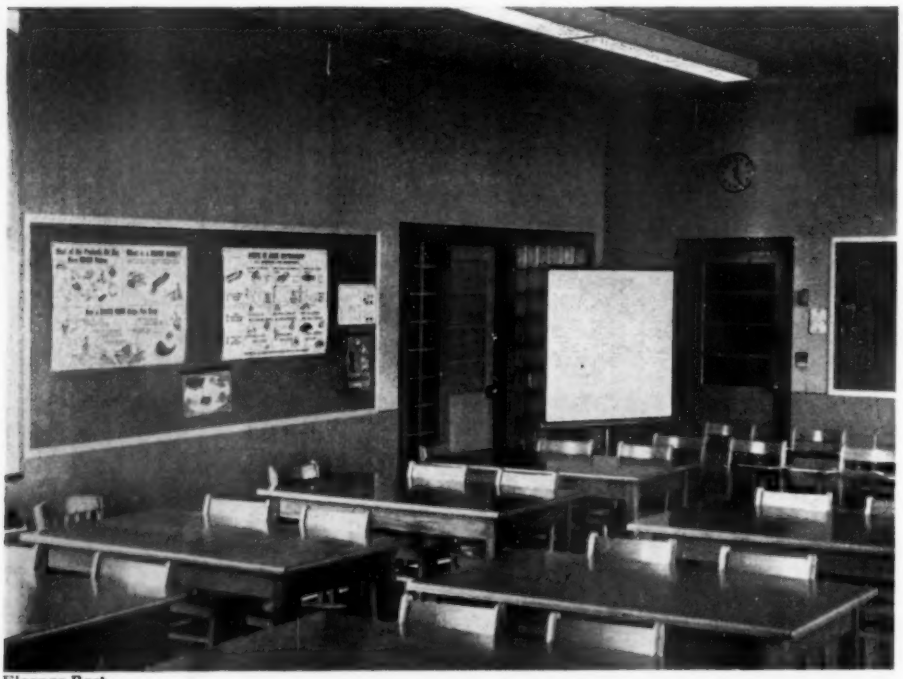
WHEN the school administrator hears or thinks about business education he generally visualizes typewriting, shorthand and bookkeeping classes. Seldom does he realize that business education includes preparation for the task of living and working in a business world. Specialized skill subjects like typewriting, shorthand and bookkeeping are only a small part of the total business education program.

When he embarks on a building program an administrator is aware of the need to provide special facilities for typewriting, shorthand and bookkeeping classes. The administrator who ignores the general business or basic business phase of the business education program when he builds a new school is ignoring the "heart" or "core" of business education. More and more schools are expanding their offerings in this area.

A comprehensive school building program must make provision for the teaching of such subjects as:

1. Introduction to Business or (Junior Business Training)
2. Economic Geography
3. Consumer Education
4. Business Law
5. Economics
6. Business Organization and Management
7. Business English
8. Business Arithmetic
9. Personal Use Recordkeeping
10. General Salesmanship
11. Senior Business Training

A basic business subject has personal use, social and consumer values for all students. It also helps to



Basic business room of the New Jersey State Teachers College at Paterson. Note the ample tackboard space and the viewing screen for visual aids.

Eleanor Rost

develop general business knowledges, attitudes, appreciations, understandings and competencies in all business students regardless of their specific occupational specialization. Basic business can be defined as the non-specialized skill phases of business education. It makes a very important contribution to the general education of all students as well as all business students.

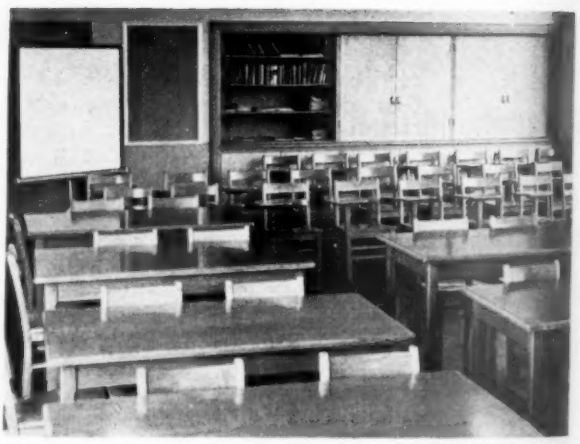
Factors Determining Equipment Needs

It is highly essential, therefore, to make adequate provision for the basic business subjects in planning and equipping a business education department. It is logical to analyze the various purposes for which the basic business room is to be used before deciding on how to equip it.

Room utilization in a small school. In a small high school it is altogether conceivable that only one room will be reserved for business education. This room must of necessity be an all purpose room. This means that the same room could be and will be used for typewriting and the other specialized skill subjects as well as for the general business offerings.

It would be just as much of an error to overlook the needs of the general business subjects as it would be to omit the typewriters. It should also be remembered that many small high schools are moving in the direction of offering more general business preparation than specialized vocational skill training.

It is advisable in a small school to provide and equip a large room of at least one and one-half units to serve all the needs of all the students. The typewriters can be housed in the rear section of this large room. The tables, chairs and other equipment should be usable for shorthand, bookkeeping and all basic business subjects.



Another view of the basic business room of Paterson College. Bookshelves and ample storage areas are essentials of such a room.

Room utilization in a large school. The specialized skill subjects will be adequately housed in special rooms in a medium-sized or large high school. The basic business room or rooms will be used for classes in junior business training, economic geography, consumer education, business law and any other non-specialized skill subjects offered. It is even conceivable that an extra shorthand or bookkeeping class could be scheduled here in a vacant period.

It is quite common in a large school to assign non-business classes to this room when it is available. This multiple utilization makes it necessary to equip the room in a suitable manner to serve many purposes.

Nature of courses taught. The most important factor in planning and equipping the basic business room

is to take a close look at all the activities which are likely to take place there. Basic business subjects are seldom taught in the traditional, routine, textbook question-and-answer manner. While it is true that there may be some formal teacher presentation, this is usually kept to a minimum by capable teachers. The progressive basic business teacher makes extensive use of:

Group Discussions	Motion Pictures
Oral Reports	Film Strips
Panels	Supplementary Reference Materials
Student Projects	Displays
Dramatizations	Exhibits
Demonstrations	Charts and Maps
Radio Broadcasts	Committees
Recordings	Conferences
Television	Supervised Study
Visiting Speakers	

It is only natural that the large number and variety of activities in which basic business classes participate will influence the planning and equipment of the classroom.

Size and layout. The nature of the courses taught will also have a direct relationship to the size and layout of the special rooms planned for them. The administration cannot expect teacher and students to carry on the many activities described here in the traditional small general classroom with fixed seats.

Conferences, demonstrations, dramatizations and displays require space and lots of it. Group discussions, panels and socialized activities require movable furniture. Speeches, dramatizations, reports and visual aids show up best when projected from a small stage. Committee work, guidance, student and teacher conferences are best handled in a small conference room. Supplementary reference materials, pamphlets, bulletins and newspapers require magazine racks and bookshelves.

Audio and visual aids demand screens, suitable shades, electric outlets and special equipment. Projects, exhibits and displays call for large work tables. Large tables boost space requirements. A large collection of "live" material takes a good deal of storage space. Teaching arithmetic necessitates ample chalkboard space. Student displays show up best on appropriate pinboards. If the administrator expects teachers to use progressive teaching techniques he must provide them with the necessary physical arrangements and equipment.

The Equipment Needed

In listing the equipment needed for a basic business class it is assumed that the architect has provided a room of the right size and design. The room illustrated is 25 feet by 42 feet with ample window space on two sides. The chalkboard extends 22 feet across the front of the room. The rear wall includes 14 feet of closet space. The pinboards cover all open wall space not occupied by closets, windows or chalkboards.

It is also assumed that a small conference room, about 8 feet by 27 feet, would be very helpful for group meetings, remedial teaching and as a workshop for pupil activities. A small stage would prove an asset on many occasions. Two adjoining rooms separated by movable walls would make a good arrangement for special occasions.

Naturally, it is assumed that the lighting is adequate and that the decorating is appropriate. The creation of an informal and pleasant business atmosphere is highly desirable. Educational planners feel that a comfortable classroom of the type suggested is a good place to study, work, talk things over, create and express ourselves, act and play and practice gracious living. Keeping these factors in mind we are now ready for the listing of equipment needed.



Many business machines cannot always be provided by a school system. However, at least one adding machine should be in use.

Fixed Equipment

Chalkboards—one wall should provide adequate coverage.

Pinboards—every available bit of wall space should be utilized for this purpose. Bulletin board displays are very popular.

Cabinets—should be built in to provide ample storage space for the large supply of available materials.

Bookshelves—built in bookshelves or bookcases are needed for the large volume of reference and supplementary material needed.

Electrical facilities and outlets—double universal service outlets at the front and back of the room should be included. They should deliver 15 to 20 amperes and 120 volts. A conduit to the front of the room should



Eastchester, New York, typing class at work. No business education course is complete which does not offer typing as a basic element.

be provided in the wall or floor for a speaker cable from the projector at the rear.

Map and screen fixtures—brackets should be installed above the chalkboard. A permanently mounted roll-type screen may be installed on brackets.

Flame-proofed drapes—a darkened room is still essential for the best viewing of films and opaque projections. Drapes or shades are widely used for this purpose.

Movable Equipment

It is understood of course that not all of the items listed are essential but many of them are in the "highly desirable" classification for basic business classes.

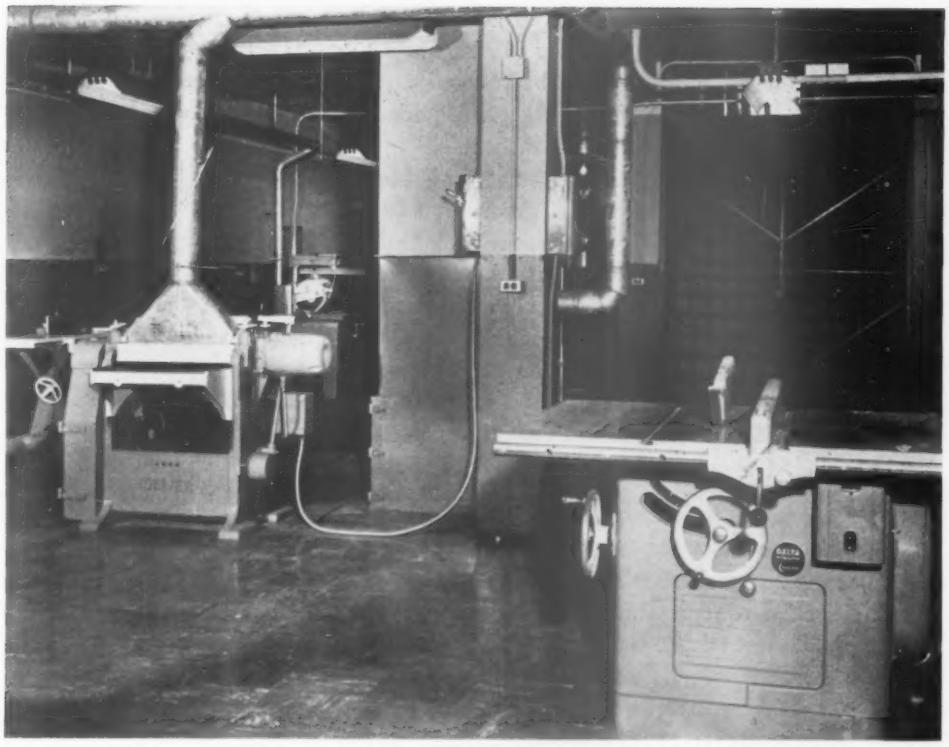
Furniture and Fixtures:

Tables, library type are preferred.
Chairs, all purpose posture type.
Work tables, several for general use.
Demonstration or special movable projection table, 40 to 48 inches high.
Conference table and comfortable chairs.
Dictionary stand, immobile type.
Display case.
Magazine rack.
Rostrum as a speaker's stand.
Bookcases or adjustable bookshelves with doors.
Teacher's desk or large work table suitable for conferences.
Files or drawers for display materials.
Adding machine.
Typewriters.

Audio-Visual Aids:

Slide and filmstrip projector.
Opaque projector, large size.
Motion picture projector.
Vu-graph or visual cast.
Maps, charts, graphs and pictures.
Specimens and exhibits.
Radio.
Phonograph.
Television receiver.
Tape recorder.

If the administrator provides his basic business teachers with facilities and equipment of this type he will have every right to expect good teaching and good learning in this very important phase of business education.



Desirable equipment arrangement to provide proper material flow from stock room (immediately back of cut-off saw) to cut-off saw, to jointer, to planer and to table saw.

PLANNING SCHOOL SHOP FACILITIES



by WELCOME E. WRIGHT

Associate Professor, Department of Industrial Education, Agricultural and Mechanical College of Texas, College Station

Dr. Wright received his B.S. degree in industrial education from East Texas State Teachers College, and M.S. and D.Ed. degrees in the same subject from the A & M College of Texas and Pennsylvania State College. He taught industrial arts at the high school level for ten years and at the college level for the past seven years.

UPON accepting responsibility for planning or remodeling an industrial arts shop, a teacher must be prepared to take full advantage of each opportunity to inform and show administration all features that will bring about a more efficient industrial arts shop. In planning or remodeling a school shop, one soon realizes that the problems involved are numerous and varied.

Some of the more pressing ones are: *First,* what is the best program possible with the facilities and funds available? *Second,* how to obtain the most usable space? *Third,* what constitutes suitable equipment? How well these problems are solved will depend upon the cooperative efforts of administration and the industrial arts teacher.

If the two are as articulate during the planning, constructing and equipping of the shop as after it is completed, the laboratory should meet such vital educational requirements as: adaptability to future needs; maximum educational values to students; safe operation; easy management; and instructional convenience.

Planning a school shop calls for four very distinct and essential steps or periods of activity. They are: the development of a guiding philosophy; a study of the basic and pertinent factors which tend to control planning for a given school; a period of preliminary planning in which different ideas are presented and studied; and a period of final planning and evaluation.

The Guiding Philosophy

Industrial arts is a phase of general education that concerns itself with materials, processes and with products of industry and their contributions to our daily

life. Learning comes through pupil experiences with tools and materials and through study of resultant conditions in life and living. This may be restated as the learning of basic shop skills, knowledge and guidance related to our present industrial civilization.

In the junior high school industrial arts should provide a period of exploration and guidance; whereas, in the senior high school, industrial arts should provide a period of advancement toward adult citizenship. A program of industrial arts must be designed to create life situations because education is life. Since industrial arts constitutes a vital phase in the general education of today's, as well as tomorrow's, students any attempt to plan or remodel an industrial arts shop should be based upon the following factors:

1. An analysis of aims and objectives through which an industrial arts program will contribute to the general education of the individual.
2. Selection of representative activities that interpret industrial life as it exists in local industries, including basic experiences and knowledge of industry on a national level.
3. Selection and statement of objectives of industrial arts based upon present day philosophy of general education.
4. Provisions to be made for services to be rendered by the industrial arts shops to community life and to the adult education program.
5. Looking ahead to future eventualities and preparation to meet new challenges.
6. Analysis of the community for which the shop is being planned—to determine the financial status of school, the community activity and industrial background and postschool activities, because some students do not continue to live where they went to school.

Controlling Factors

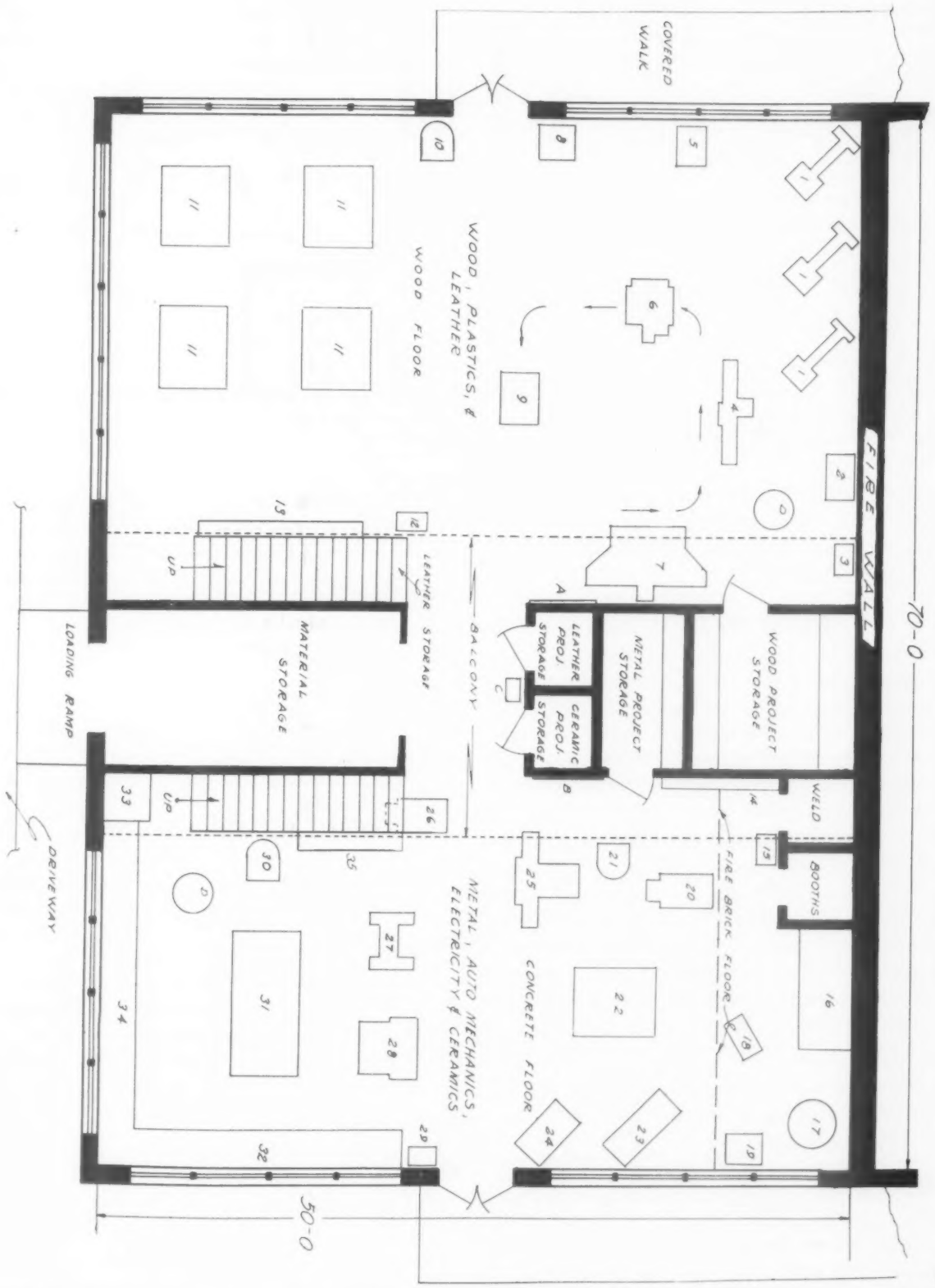
It would be quite difficult, if not impossible, to discuss fully all the conditions, situations, factors or problems that may be involved in planning or replanning shops. Situations and conditions which are characteristic of the school or area for which a given shop is being planned must necessarily be approached at the local level and may require extensive study and research.

Much embarrassment resulting from poor planning can be avoided if emphasis is placed upon the guiding philosophy, and if the planning group gives serious thought and time to the following factors which tend to control planning for a given school:

1. Funds available.
2. Activities to be taught.
3. Expected enrollment, present and near future.
4. Age and grade level of students.
5. Location of the shop with reference to other rooms in building.
6. Whether the shop should be a separate building or a wing of the main building.
7. Type of electrical power available.
8. Safety precautions.
9. Outside entrance, access for deliveries.
10. Toilet facilities needed.



The tool panel of the industrial arts shop should have ample floor space around it to permit users to select tools without crowding into machinery.



Suggested plan for a comprehensive general shop. Equipment identification is as follows: 1. wood lathes, 2. sander, 3. tool grinder, 4. jointer, 5. band saw, 6. planer, 7. cut-off saw, 8. shaper, 9. table saw, 10. drill press, 11. work benches, 12. grinder, 13. tool panel, 14. metal tool panel, 15. grinder, 16. molders bench, 17. furnace, 18. anvil, 19. forge, 20. shaper, 21. drill press, 22. work bench, 23. lathe, 24. lathe, 25. milling machine, 26. power hacksaw, 27. brake, 28. shears, 29. buffer, 30. drill press, 31. sheet metal bench, 32. electrical work bench with supply cabinet below, 33. ceramic kiln, 34. ceramic work bench with supply cabinet below; A. bulletin board, B. bulletin board, C. drinking fountain, D. round wash sinks.



Balcony detail for suggested shop plan shown on preceding page. Drawing area in the balcony assures some degree of quiet and isolation for industrial arts pupils.

The foregoing is only a partial list of the many items that must be considered and the importance of making a complete and comprehensive list cannot be over emphasized.

Preliminary Planning

Since many things must be taken into consideration and much forethought and sound thinking given to designing a school shop, the planning group must take advantage of every opportunity to obtain information or ideas. Other schools offering industrial arts should be visited, especially those known to have well designed and managed shops, and nearby industrial arts teacher training institutions might be asked to assist in the planning.

During the preliminary planning period a committee or teacher will be seeking answers to problems which have to do with specific building features and with proper equipment arrangement.

The following criteria should prove quite valuable in dealing with building features:

Place

1. Entire separate building.
2. Separate building attached to main building.
3. Wing of building.
4. Accessible for adult evening use.
5. Not isolated, but located so as not to disturb other activities.
6. If a separate building, it should be connected with covered walk.

Floor Level

1. First floor, one to three steps above or below grade level.
2. Second floor, undesirable in most cases—satisfactory for drawing room, electricity shop and crafts.
3. Basement is very undesirable because machines and tools will be exposed to excessive moisture.

Accessibility

1. To rest of school.
   a. One large main entrance or exit to principal corridor.
   b. Within 50 paces of adequate toilet units.
   c. The centralization of all shop rooms on one floor.
   d. Adjacent to necessary storage rooms.
2. To outside.
   a. Outside double doors should open to driveway if possible.
   b. A ramp should lead from outside doorway to driveway.

Orientation (direction to face)

1. Drawing rooms should have north light.
2. A corner room preferred or a bilateral room when depending upon natural lighting.
3. Windows grouped on one side if width of room is not over 24 feet wide.
4. Located in relation to prevailing breeze.

Size and Shape of the Laboratory

1. For an enrollment of 12 to 24 pupils about 1,800 to 2,400 square feet would be an adequate floor area.
2. The rectangular shape shop is most desirable with a ratio of 1:2 as regarding width to length.
3. A shop with a 12-foot ceiling should not be over 24 feet wide, if lighted from one side.
4. For the ordinary general shop 75 square feet per pupil gives a very satisfactory floor space.
5. Open floor space for assembly area.

Auxiliary Facilities of the Laboratory

1. An auxiliary facility is a necessary adjunct to the efficient operation of a laboratory shop, but not so important a phase of its operation as to be considered on a par with the various shop units.
2. The shop auxiliaries may be one or more of the following: (a.) finishing, (b.) supplies, (c.) project storage, (d.) planning center, (e.) demonstration, (f.) toilet, (g.) office, (h.) display.

General Statements Regarding Facilities

1. Tool cabinets should be centrally located in the middle of a long wall.
2. Storage and supply rooms are usually placed where the space is not considered so valuable as that of classroom area.
3. First aid cabinet should be most conveniently located as regards washing, lighting and resting facilities.
4. Lavatories, drinking fountains and sinks should be placed in the laboratory shop and should be visible from entrance.
5. If possible, a lecture-demonstration bench should be a permanent installation and so located as not to have pupils face the light.

Building Details

1. *Floors*
   a. One of the most important parts of the shop.
   b. Solid wood floor desired, also wood blocks.
   c. Fire brick or hearth for hot metal area.
   d. Cement floor for auto and metal units.
2. *Walls*
   a. Dull-glazed brick up five feet from floor makes a good wall for a shop.
   b. Upper walls and ceilings should be plastered with an acoustical or soft plaster.
3. *Balconies*
   a. Where floor space is limited, a balcony placed 6 feet 6 inches from ceiling provides working or storage spaces.
   b. The balcony should not be located to interfere with the daylight.
   c. Quite often the space above the office, planning center and project storage may be used for a balcony.
4. *Ceiling*
   a. Height of 12 to 15 feet.
   b. Should be acoustically treated.
   c. Avoid open beams.
5. *Vents, Flues*
   a. All kilns, forges, furnaces, automobile exhausts should be connected to flues or exhaust system.
   b. Building laws supply data regarding flues.
6. *Window Placement*
   a. Upper part of window is much more effective.
   b. Windows with narrow mullions are best.
   c. Glass area ratio to floor space should be 1:4.
   d. Top of windows should be at a distance equal to half the width of the shop.
   e. Bottom of window should be 4 to 5 feet above floor.
7. *Shades* (Venetian blinds are best)
   a. Shades should be very translucent and of color that harmonizes with room finish.
   b. Fastened so as to protect from sun without shutting off light unnecessarily, movable or double mounted with one curtain at top of window and one at center of window.
8. *Wall Finishes*
   a. Walls and ceiling should be light in color.
   b. Ordinary plaster walls or painted brick walls commonly accepted.
   c. Height of ceiling should be at least 12 feet.
   d. Glazed tile or brick to a height of 5 feet.
9. *Partitions*
   a. Upper part of partitions between laboratory and auxiliary rooms should be transparent and as soundproof as possible.
   b. May be made from glass, tile brick, wood, depending upon individual situations.
   c. Should not be bearing walls.
10. *Doors, Entrance and Interior*
    a. All doors should swing out.
    b. Use only one large entrance to laboratory, large enough to admit automobile.
    c. Master key all locks to doors of laboratory.
    d. Avoid use of laboratory as passage to other rooms.
11. *Chalkboard and Bulletin Boards*
    a. Chalkboard and bulletin boards should face the light.
    b. Slate chalkboard recommended.
    c. Minimum of about ten linear feet per laboratory.
    d. Chalkboard should be at least three and one half feet wide.
    e. Minimum size of bulletin board, 24 square feet.
    f. Bulletin board should be placed at same height as chalkboard.
12. *Plumbing*
    a. Every laboratory should possess a drinking fountain.
    b. One washing facility should be provided for every eight pupils.
    c. Gas, if available, outlets of various sizes to fit equipment.
       (1) Bench outlets, ½ inch.
       (2) Forges and furnaces, one inch.
13. *Lighting and Power*
    a. Separation of light and power switches.



This project storage area for student handiwork provides open shelves and open storage space for items in various stages of completion.

b. One primary power switch controlling all equipment.
c. Individual switch for each primary machine located in power panel.
d. Place 110-volt wall plugs every 15 feet around shop 40 inches above floor.
e. Provide local lighting on all machines where precision work is performed.
f. Equip all motors with overload protective devices.
g. All electrical installations in the finishing room should be of the explosion proof type.
h. Voltage and phase of current.
i. Future needs.
j. The light at bench height all over the laboratory should be 30 to 50 foot-candles.
k. The light on the working area in the drawing, printing and planning room or area should be approximately 50 to 60 foot-candles.

(1) An article by William G. Darley, "Seeing in the Schoolhouse," appearing in the March, 1946, and April, 1946, issues of *Industrial Arts and Vocational Education* magazine, should be studied and analyzed for assistance in providing illumination in the school shop.

14. *Heating System*
    a. Centralized heating unit preferred.
    b. Maintain low temperature—65 to 70 degrees.
    c. Possibility of handling increased load.
15. *Safety Provisions*
    a. Paint safety zones around machines having zones of danger.
    b. Cover slippery floors where machine operators stand with non-skid material.
    c. Machines which present hazards should be isolated from traffic.
    d. Aisles around machines should be wide enough so that operators will not be distracted.
    e. Provide fire extinguishers, hose and fireproof cans for waste.
    f. Provide adequate ventilation for finishing room, welding booths, forger and furnaces to eliminate excess heat, fumes and dust.
16. *Tool Storage*
    a. Open tool panels preferred.
    b. Should be centrally located.
    c. Separate tool panels should be provided for each type of activity.
17. *Finishing Room*
    a. Located to take full advantage of natural light.

b. Avoid locating near dust creating area (machine area) of shop.

c. Needs much more illumination than other area of shop.

d. Provide an adequate exhaust system to remove fumes and gases.

e. Electrical installations should be explosion proof type.

18. *Color Scheme*

a. Wall Paint

(1) Should possess a slightly higher sheen than average flat wall paint.

(2) Sheen should be sufficient to reflect illumination in a diffusing manner.

(3) Dado should be of the same hue (color family), but lighter than that used on base of machines.

(4) Wall above dado line should be much lighter than dado, but of the same color family.

(5) Colors with a light-reflecting power of 50 to 60 percent should be used.

(6) Such colors as sea-foam green, eye-rest green and cascade blue are recommended.

b. Ceiling Paint

(1) Colors with a light-reflecting power of 75 to 85 percent should be used.

(2) Dead white possessing no "specular" reflection, cascade blue or sea-foam green are recommended.

c. Machinery Paint

(1) Use color to create a visual working area that will reduce eye fatigue.

(2) Separate critical from non-critical parts by use of color.

(3) Use focal colors such as ivory, cream or buff on operating or critical parts. These parts should always be visible to the worker.

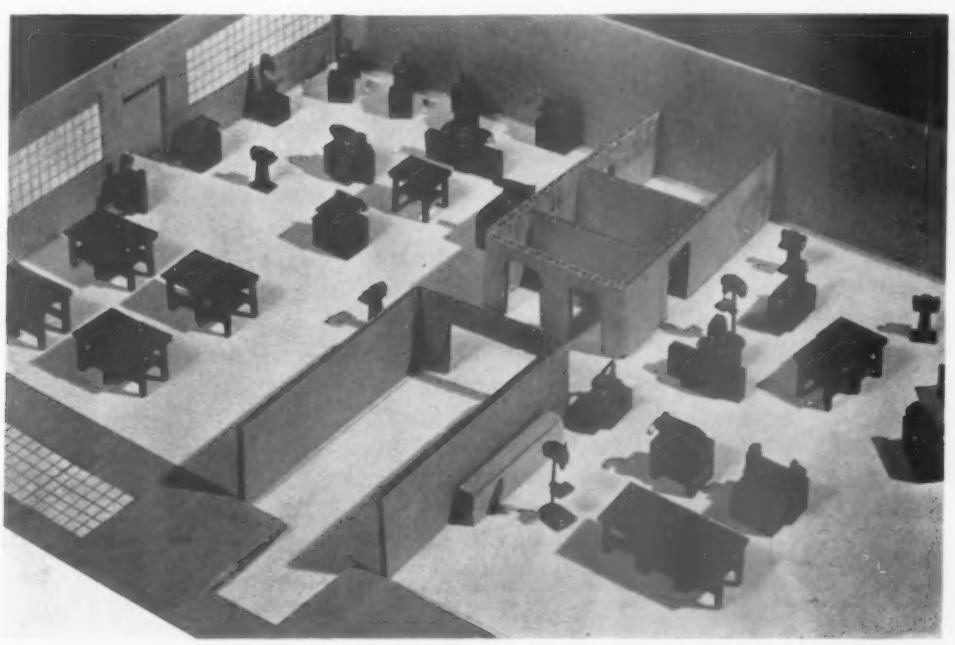
(4) Use a receding green on stationary parts.

(5) Use synthetic resin paints on all machines and equipment.

Equipment Arrangement

Proper equipment arrangement is one of the more important phases of school shop planning. Machines should be located so that: optimum illumination is achieved; sufficient space is allowed for machine operation; there is proper sequence in machine use; crowded conditions are eliminated, and hazardous moving parts are situated so that possibility of accidents is minimized. Special effort should be made to plan a shop so that time, space and materials will be saved. Safety, illumination, student traffic and material flow are most urgent and should receive careful consideration during all phases of planning.

Proper equipment arrangement is so vital it cannot be over-emphasized, and those responsible for planning a shop should utilize every idea and means available to achieve the most desirable arrangement. One very effective and efficient means by which this end may be realized is through the use of three-dimensional scale models. A most difficult phase of school shop planning for all those concerned is that of visualizing the amount of space required by various pieces of equipment and the work area needed. Those who have employed three-dimensional scale models in planning have found them an accurate and quick method for solving this problem. This device gives a designer an accurate insight of space, equipment, arrangement and all factors of a final full-scale set up that is quite difficult, if not impossible, otherwise. The



Three-dimensional scale models are used most effectively in the planning of school shops.

template, or two-dimensional method, is of value in equipment location, but it lacks space visualization.

Final Planning

The many ideas developed and presented during the preliminary planning period must now be studied very closely to determine advantages and disadvantages of each. This procedure is especially important when the preliminary period is used to study and design specific areas of the shop, such as bench area, machine area, etc., independently. Desirable features of one idea may be combined with those of another more readily by the independent method of overall shop planning, but special attention must be given to coordination of shop activities.

During the final planning period further consideration should be given to the color scheme in a shop. Recent research and studies verify the power and importance of color. By employing scientific color schemes, factories have increased efficiency and production because color possesses inherent power. Thompson[1] has the following to say about color:

> Some colors actually increase muscular reaction; others have a pronounced effect on the mind. Many colors make a person feel warm; others impart a feeling of coolness. Some colors create illusions making objects appear larger or smaller. There are certain shades that impart sadness and grief and others that connote happiness and cheer.

From this one might conclude that by applying color properly, a school can work wonders in a school shop. For example, the principles of color dynamics were used in the industrial training rooms in the Northrop Aeronautical Institute, Hawthorne, California, during the war and, according to Thompson, it is estimated that the efficiency of the students increased approximately 60 percent through use of carefully selected eye-rest and cheerful colors.

The primary objective of the final planning period is to draw up and submit those ideas and features that give the most efficient program possible with the funds and facilities available. If there has been close cooperation within the planning group and between it and the administration, creative thinking and energetic committee work and if all essential building features and factors previously stated are considered and provided, a most complete and ideally designed shop may be realized.

Typical Problem

Some of the ideas and factors to be considered in planning school shop facilities which have been presented in this article were applied in designing the comprehensive general shop shown in the accompanying illustration. The building was designed for a school which requires one full-time industrial arts teacher at present, but anticipates facilities for one and perhaps two more full-time shop teachers in the near future. The laboratory is designed so that a class in woodwork or crafts and a class in metalwork or electricity can operate simultaneously while a drawing class is in session on the balcony. Also, with good management, a teacher could operate a comprehensive general shop course very effectively in this area.

The plan provides such desirable features as convenient and adequate material storage, project storage, desirable flow of material from machines, conveniently located tool storage, ample work and assembly area, multiple activities, finishing room removed from dust creating areas, wide aisles, adequate and convenient service entrance, efficient lighting and ventilation and sufficient open floor space at pupil entrances and exits to eliminate congestion.

The plan is not presented as a model or answer to all problems involved in designing school shops. As previously stated, the situation, conditions and characteristics for each school differ and the solution to these problems must come from the local committee. The plan shown is not a model shop, but it does incorporate some desirable planning ideas. Perhaps it might meet the needs of certain schools.

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[1] Thompson, J. C., "Color in the School Shop," *Industrial Arts and Vocational Education*, Milwaukee, Wisconsin, The Bruce Publishing Company, Volume 36, 1947, page 99.

A UNIFIED ARTS PROGRAM FOR JUNIOR HIGH SCHOOLS



by JAMES A. LEWIS

Superintendent, Dearborn, Michigan, Public Schools

Mr. Lewis began his educational career as a teacher. From there he was an elementary principal, then a high school principal. He has been a superintendent of schools since 1938, and has held his post in Dearborn since 1948. Mr. Lewis has a B.A. degree from Central Michigan and an M.A. from University of Michigan.



and HERSCHEL K. BENNETT

Assistant Superintendent, Dearborn, Michigan, Public Schools

Mr. Bennett has been a school administrator since 1927. He has been with the Dearborn Public Schools since 1946. Mr. Bennett was graduated from Iowa State College in 1924 and has an M.A. degree from the State University of Iowa. He also has served as chairman of curriculum development for the state of Iowa.

LIKE most school systems in the nation, Dearborn has been confronted with marked increases in enrollment. The problem has been unique, however, because not only an increased birthrate but a vast home building program, bringing many new families to the community, has necessitated the planning of several new junior high school buildings at the same time that elementary buildings are being constructed.

Elementary Schools First

The construction of the first new elementary schools in 1949 and 1950 came at a very opportune time, as elementary teachers had been engaged in a system-wide curriculum study since 1946. Agreements had been reached and first steps taken to gradually reorient the elementary instructional emphasis from a semi-platoon departmentalized program to the beginnings of a self-contained classroom situation. Organizational changes followed in 1947 to facilitate the accepted concepts of a school day in which the elementary teachers (K-6) were able to direct most instructional activities within their individual classrooms.

This was the period, also, during which teacher committees were working with architects and parent representatives on plans for new elementary schools. As these plans developed it became apparent that the new buildings would reflect a complete acceptance of the self-contained elementary classroom philosophy.

Now for the Junior Highs

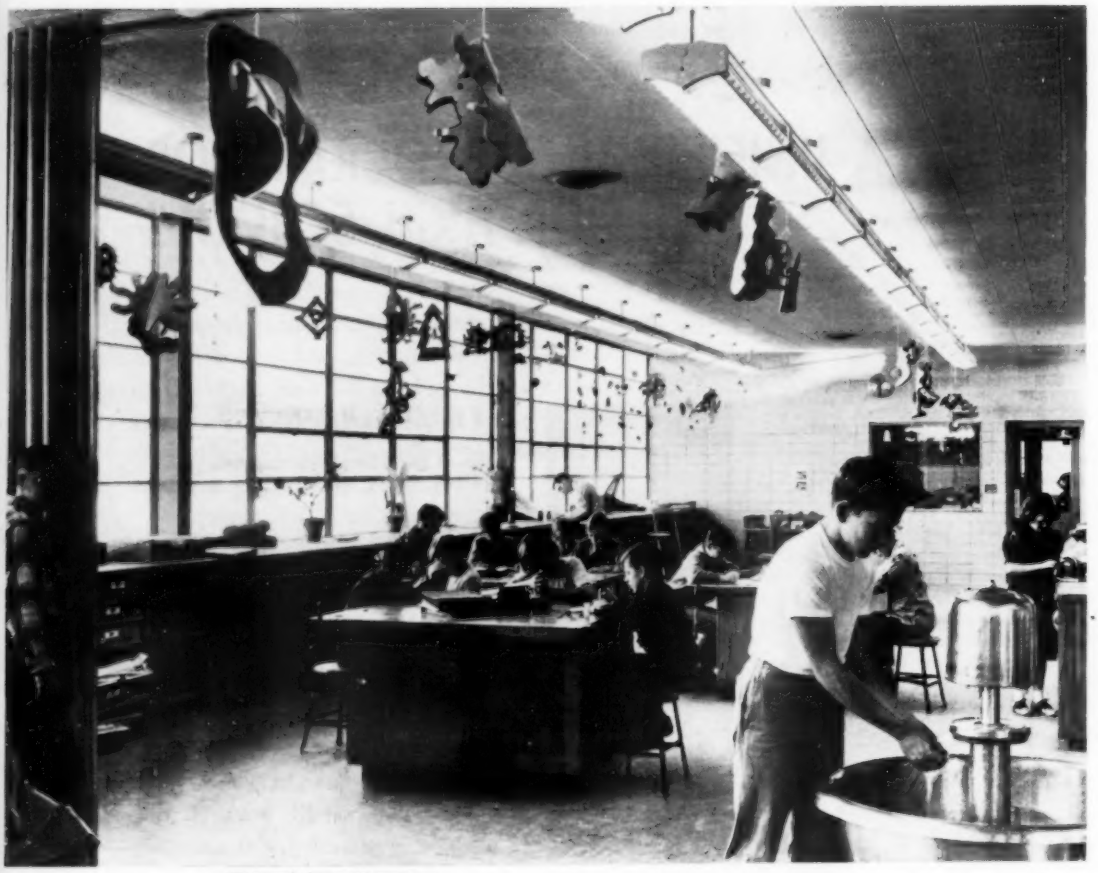
Plans for the new Clara Bryant Junior High School were initiated in the school year 1950–51. This was the first of three new junior highs to be planned. Thoroughly believing that the teachers who would work in the building should have a voice in planning, the administration early set up a teacher-planning committee to work with the architect. In this manner, the principle that the building should be designed to fit the educational plan developed by the staff which would use it was maintained exactly as in planning for elementary buildings.

Many weeks were devoted to the development of the educational plan before the actual drawings of the architect were started. During this time the architect sat in on many of the meetings in an effort to catch the vision of the committee as it evolved, as well as to catch the spirit for a dynamic kind of instructional program which the vision inspired.

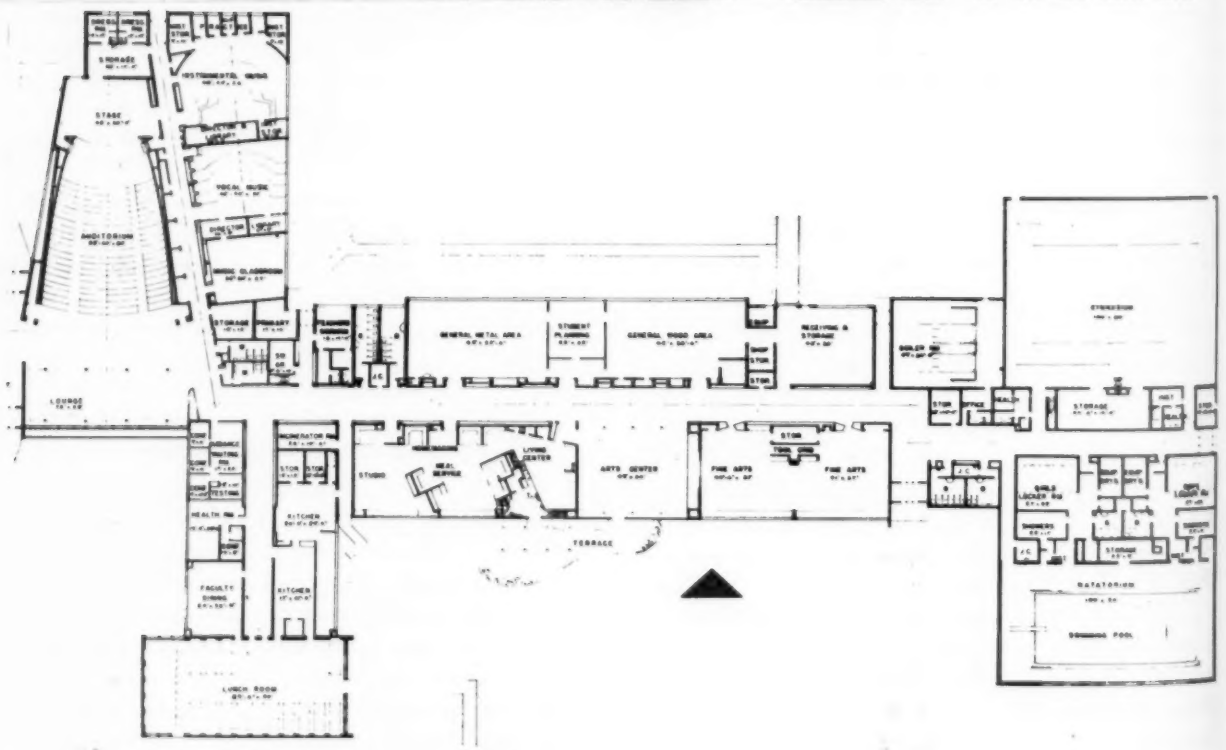
Committee Organization

The committee membership was not confined to junior high school teachers. In addition to representatives from all instructional areas and services in the junior high schools there were elementary teachers, two senior high teachers, special teachers representing all special areas, two junior high principals, the assistant superintendent, the assistant to the superintendent in charge of planning, and the superintendent of schools. With such a complete cross section of the system represented, the horizons of the committee were greatly broadened and many new concepts and ideas were thoroughly explored and discussed.

It is interesting to note, also, that junior high teachers from all instructional areas were not "dyed in

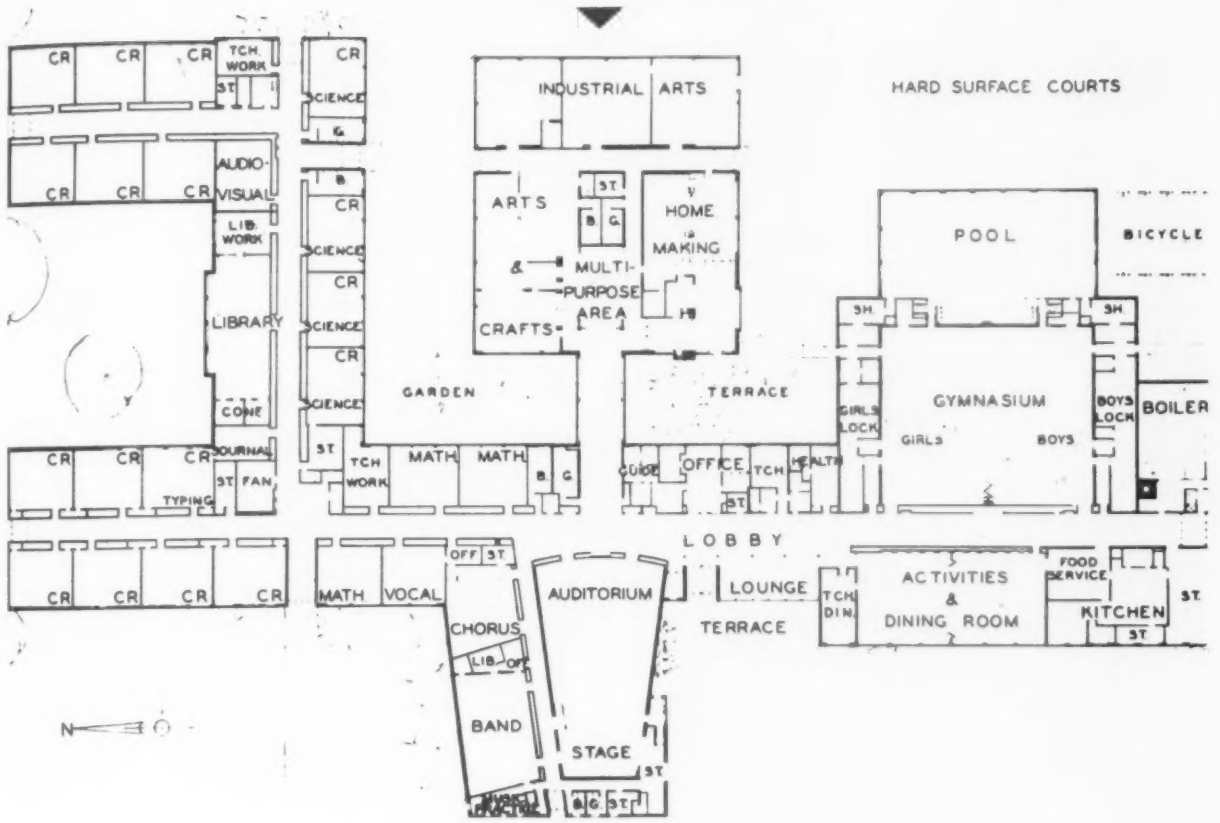


A large hand wash basin is located between the two halves of the art room of the Bryant School in Dearborn. The room can be divided by the multifold curtain seen at left. Below is part of the floor plan of the O. L. Smith Junior High School in Dearborn. Jahr-Anderson Associates, Inc., architects. Arrow indicates the arts and crafts area.



the wool" 7th, 8th and 9th grade traditionalists. Some had been working on blocks of time and core experiments. Many on the committee had teaching experience in 7th and 8th grade rooms where these grades had been part of the elementary school program. The K-6-3-3 pattern was new to the total Dearborn community although some of the schools had been organized on the K-9-3 pattern.

Many of these committee members also had been close to developments in the evaluation of the new ele-



Plan of the Clara Bryant Junior High School in Dearborn, Michigan. Eberle M. Smith Associates are the architects-engineers. The arts and crafts area includes a multi-purpose area which is adjacent to the homemaking suite.

mentary instructional program. They reflected a yearning to consider some of the improvements in the general learning situation of the new elementary schools in the planning for the new junior high. This was evidenced initially in the desire to create classrooms in which some of the advantages of the self-contained situation could be retained in the junior high program. Agreement was soon reached for certain modified elements in some of the classrooms for English, science, social studies and mathematics.

What About Special Subjects?

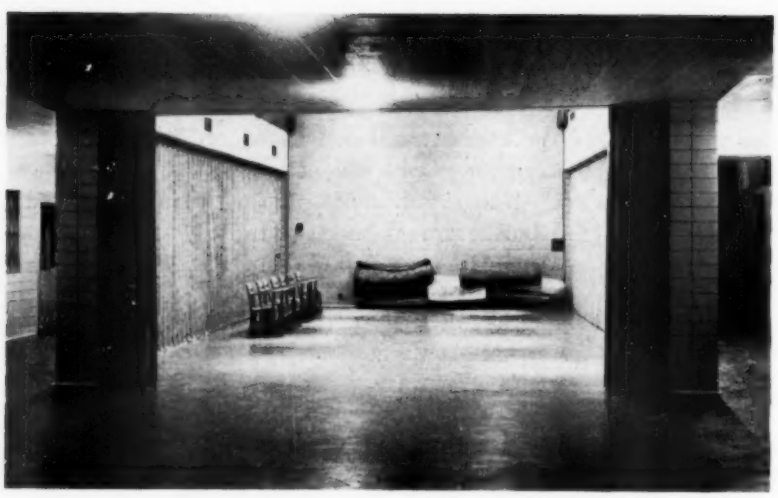
The committee agreed also that they were not ready to try to incorporate the special subjects in any blocks of time which might be tried in the new classrooms. On the other hand, great fears were expressed lest the special subjects, especially in grades 7 and 8, be too specialized or departmentalized. Art, homemaking and manual arts teachers were especially concerned as to the direction in which these programs should be developed. At this point, there was much discussion about the possibility of a team approach in these areas, exactly as was developing in the traditional subject matter areas.

The idea of planning so as to bring all departments related to the creative arts together in one section of the building was first introduced by a member of the committee who was enthusiastic about the teacher team idea. His thoughts were not readily accepted at first by the group, but as the idea was discussed and new suggestions offered, a plan gradually evolved which was acceptable to the entire committee.

This plan, which was incorporated in the Clara Bryant School, provides a wing of the building extending away from the entrance to the auditorium and connected with it by a wide corridor. Across the end of the corridor is the shop area—general wood, general metal and power. On either side of the corridor and extending up to the shops are the homemaking and art spaces. The portion of the widened corridor next to the art and homemaking departments is designed as a gallery for display purposes, which is used by all three departments. The gallery is enclosed by multifold curtains which, when left open, leave the gallery as a part of the corridor. At the other end of the corridor along one side of the auditorium, in ready access to the stage, are the band and chorus rooms. Thus, the one corridor serves as the connecting link for all of the related arts, with its gallery serving all departments as a display and overflow activity area.

The building, while not quite completed, was occupied in the fall of 1951. Because of the difficulties en-





The clay work area of the Clara Bryant art room is one step below the remaining portion of the art room. It has a cement floor and open drains so that it can be hosed down for easy cleaning. The central area of the unified arts wing at Bryant School can be closed off with multifold curtains (left). It is used as a large project or joint project work area, or as visual or social areas. The art room is to the left, the general shop in back and the homemaking area is to the right.

countered in holding classes with scores of workmen roaming the corridors and at times interrupting the classes, it was difficult to implement the new program. Then, too, it was discovered that new frontiers were being explored calling for new techniques, new approaches and much more cooperative planning than heretofore. Teachers began to wonder whether the plan they had visualized with such enthusiasm could be implemented after all. Perhaps it would be just as well to settle into the old routine and forget about trying to unify the arts.

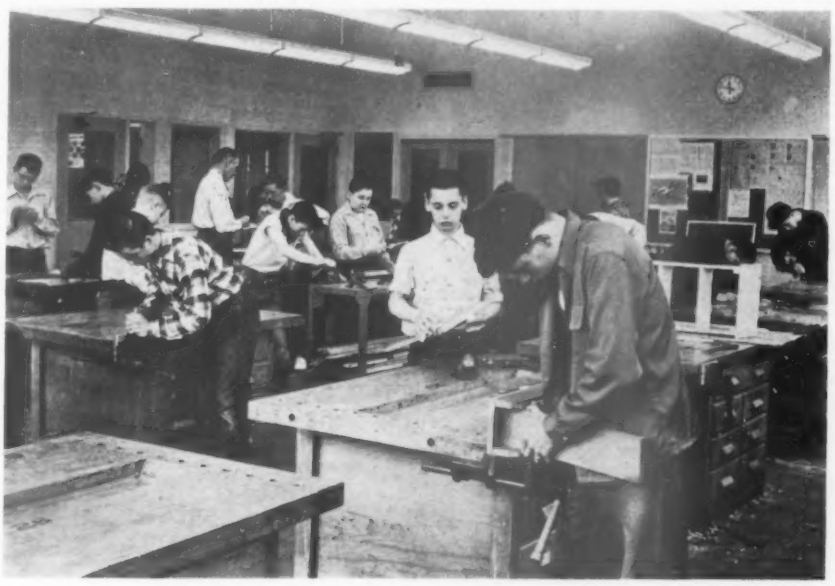
In Dearborn it has been customary to offer a variety of inservice courses each year. It became evident that a course for all junior high art, industrial art and homemaking teachers might be of help in implementing the unified arts program. The problem was to find the unifying element which could bind the three groups together in a common effort. This was the hope expressed in the discussions of the planning committee.

The committee used the illustration of the kind of planning required in automotive design as an example of the manner in which these departments should function. Here the artist, the engineer and the patternmaker must work as a team in creating and developing new

models. Why not organize an inservice course taught by an instructor who had a background of experience in industrial design? Accordingly, a search was made for such an instructor and the course was organized. All junior high homemaking, art and industrial arts teachers in the system and most junior high principals enrolled in the course for one semester.

The first few meetings were devoted to a discussion of common problems. What were the elements which interfered in developing the program as it had been visualized? One of the problems seemed to be difference in objectives. Another was reluctance on the part of instructors in each department to make their equipment readily available to instructors and students from other departments. There was also the problem of routines, old and well-established projects, old patterns of class conduct that were interrupted by the new ideas.

The next step was to make a tour of each department where the program in each was carefully outlined for the entire group. As a result, each teacher gained a better understanding of the contribution made by the other departments to the student's total educational experience. They also began to see the close relationship in basic concepts between departments and how they were often seeking common goals or objectives. In many instances, too, they saw that their objectives, when achieved, were supporting elements for objectives sought in other departments.



This is one of the three rooms of the general shop area provided in all three of the new Dearborn junior high schools.

Agreements Are Reached

Believing that there were many objectives the three departments were seeking in common, they subdivided into their respective groups and developed painstakingly a set of objectives for each. These were then presented by a representative from each section to the entire group. Working later in small mixed groups, with all three sets of objectives before them, they attempted to develop a single set upon which all could agree. This stimulated much discussion and clarification of meaning, which in the end resulted in a single set of basic objectives which all could accept.

The group agreed that the common objectives of homemaking, fine arts and industrial arts provide:

1. For the development of a habitually creative child.
2. An effective correlation between unified arts and other areas of the junior high curriculum.
3. For individual differences of students within the courses.
4. Some areas of work in which both boys and girls may participate.
5. For more efficient use of available resources through wise planning, care and use of consumer products.
6. Opportunities for investigation and experimentation through a great many media.
7. A wide range of experiences of beauty and an extension of perception.
8. An understanding of concepts of functional rightness, organic structure, design, etc.
9. For an appreciation of home and family living as it exists in a changing culture.
10. Educational, prevocational and avocational guidance.
11. For the development of a balanced personality through consideration of emotional, intellectual and physical being.

Other conditions which the group agreed must prevail were:

1. The facilities of each department must be readily available to all instructors and students.



This living room and compact grooming demonstration corner at Bryant School serve as the home and family living area where both boys and girls hold classes. A fireplace is against the left wall. There is an adjoining kitchen and dining wing.

2. The departments must be opened up to other groups for short periods of a week or two, permittings boys to get short periods of instruction in homemaking and the girls to get opportunities in shop.
3. Channels of communication between departments for instructors whose students have projects involving all departments must be clear to provide an opportunity for discussion and adequate and necessary planning.
4. The instructors in the three departments must work as a team in furthering the unified concept of the arts. This calls for a healthy understanding and appreciation of the contribution each department can make toward the total well-rounded experience of the child with whom they are working.

The Program in Practice

Student projects may originate in any department which will involve the use of tools and techniques used in the others. The shop student who is planning a table lamp for the home will work out his design for lamp and shade in the art department, make the lamp in the shop, and go to the homemaking or art department, or possibly both, to make the shade, depending upon the kinds of materials used. Likewise, the project might originate in either of the other departments.

The homemaking student might choose a curtain project calling for blockprint designs using the art department to develop the design, the shop to prepare the block, and the homemaking department to complete the sewing involved. Such a project again might originate in either of the other departments. Regardless of its place of origin the cooperative efforts of the instructors in other departments is necessary.

The art student interested in redesigning and covering a piece of furniture would develop the design in the art department but might confer with the homemaking teacher about fitting the design into the home arrangement. Further, much or all of the actual work in redesign and recovering might be done in the shop under the shop teacher's direction.

Obviously, not all projects would cut across all departments. Nor should efforts be made to involve other departments just for the sake of integration. However, when the nature of the project is such that tools and equipment from other departments are needed, or when the counsel of other instructors will be helpful in the interests of better quality and a more comprehensive experience for the student, they should be involved.

Good *esprit de corps* among the members of the departments concerned is essential. Rigid compartmental lines must be obliterated and free flowing channels of communication established both for teachers and students. Sharing corridors and gallery helps to achieve these aims. When members of the instructional staff join in an effort to achieve common objectives most of the obstacles are removed and successful cooperative endeavor is assured.

ESSENTIALS OF STAGE DESIGN FOR SCHOOLS

by WILFRED F. CLAPP

Assistant Superintendent, School Organization and Plant, Michigan Department of Public Instruction

Wilfred F. Clapp received his B.A. degree from Kalamazoo College and his M.A. from the University of Michigan. From 1931 to 1937 he served as Superintendent of Schools in Ovid, Michigan. Since 1937 Mr. Clapp has been with the Michigan Department of Public Instruction as Assistant Superintendent of Public Instruction in charge of School Organization and Plant, except for two of the war years when he was Senior Specialist on School Facilities with the U.S. Office of Education.

and LAURA V. SHAW

Head of the Department of Speech, Western Michigan College (retired)

Miss Laura V. Shaw retired in June, 1953, as Head of the Department of Speech at Western Michigan College of Education, Kalamazoo, after thirty-five years of service with the college. At the present time she is doing a limited amount of consulting on community school and theatre planning. Miss Shaw has an A.B. from Ohio Wesleyan and an M.A. from the University of Michigan.

MOST of the new school buildings being constructed and to be constructed during this era of school construction will have one or more stages of some sort. The fact that stages are so common in schools expresses a conviction on the part of those who plan the schools that there are educational values to to gained from dramatic and auditorium activities that cannot be as effectively gained through any other means. The architectural expressions of this conviction, however, often leave much to be desired. Too often there is apparently considerable thought about the "out front" facilities, but very little about the stage itself and its necessary auxiliary spaces.

Much of the educational value to the child is in the participation, the creation of the activity, the performance itself, as well as in the sitting and listening. This does not mean that we should neglect good planning of the audience area, but rather that we should plan more carefully the stage area itself in terms of the peculiar educational function that a school stage possesses.

The idea that the planning of a school building should be shared by those who are going to use the building applies equally well to the stage area. The activities to be carried on in a building determine the shape and arrangement of the building and its parts. If the architect is to do an intelligent job of planning the stage area, he must be given a description of the activities to be carried on in that area, rather than simply be told that a stage is needed. This description should tell him:

(a) The kinds of dramatic and auditorium activities, both school and community.

(b) The probable numbers of participants.



The French class of the Caroline County High School, Caroline County, Virginia, is presenting the play, "Bluebeard." Whether for a small production of this kind, or for a presentation involving hundreds of students, stage areas should be available to suit the needs of each individual school.

Standard Oil Company

(c) The kinds of scenery to be used and the extent to which it will be constructed in the school.

(d) Lighting equipment needed.

(e) The kinds of other equipment needed.

(f) The kinds of equipment, costumes and supplies to be stored.

(g) The need for make-up and dressing room facilities.

Special Advisory Services

Advisory services beyond the resources of the planning committee, and in addition to the architect, will be needed if the local committee or school system does not include someone experienced in educational theatre. Although the theatre technician may have much help to offer, all advice should be considered in the light of school use and educational purposes, lest the result be an over-equipped stage suitable for the professional theatre but not too well adapted to school use.

All during the planning stages, starting with preliminary sketches through the preparation of working drawings, there will be a need for frequent conferences and checking.

The Stage in the Elementary School

Children, left to themselves, dramatize creatively. The child of three imagines himself an engineer, a fireman, an airplane pilot, arranges "properties," such as furniture, to represent the real thing and himself acts the part, making appropriate and sometimes disconcerting noises to represent the action. The urge to dramatize will continue through the school years if we know enough to encourage it and not suppress it.

The elementary school stage should be designed for creative dramatics. This means space in which to play and if it is to be created for others, a raised space. This does not necessarily mean a fixed stage in an auditorium with a set time each day for such activities. Rather, the dramatization should grow naturally out of classroom activities and may never leave the self-contained classroom.

Folding and Portable Stages

Thus, we see some advantages in the folding and portable stage. Some multi-purpose rooms have been equipped with these stages. One, which we know of, has a recess in one wall to accommodate the stage when folded. When pushed out from the wall, this makes a stage at one end of the room. Tracks for draperies and curtains are installed in the ceiling and by their use the stage is enclosed, wing space is available and shielded entrance to the stage by performers is provided. Furthermore, this stage need not be left at one end of the room, but may be moved to any position in the room. Located at the center, a "theatre-in-the-round" for any arena activities is possible.

The stage mentioned above is divided into sections so that any size wanted may be had, or so that if and when a larger stage is needed the size may be increased. One section can easily be wheeled into a classroom and often is, so that creative dramatizations within the classroom are encouraged. This scheme seems to meet all school and neighborhood needs very well.

Fixed Stage Auditoriums

Many elementary schools will want auditoriums with fixed stages. The following directions should be observed:

(a) Keep the auditorium small and friendly. Design it to reduce barriers between performers and audience.

(b) Provide good acoustics. Reduce reverberation, but do not make the room too "dead" acoustically. Technical advice is needed. Size, shape and acoustics should be such that children's voices can be heard *without resorting to mechanical amplification.*

(c) Steps between the stage and the seating space, as wide as the stage, will help bring the stage close to the audience and will be useful for various kinds of performances.

(d) Make the stage wide enough. A 30-foot proscenium arch is suggested to allow for large groups and pageantry.

(e) Make the stage deep enough. Insufficient depth is the most common fault with all stages. Twenty-five to thirty feet is suggested, with preference for the larger dimension.

(f) Unobstructed wing space equal or in excess of the stage area proper is an absolute necessity.

(g) Provide for good circulation *on* and *off* the stage from the school corridor without passing through the main body of the auditorium, and out of view of the audience.

(h) For the elementary school stage, dressing rooms and make-up rooms are not essential.

(i) Stage workshop space is necessary, but in the elementary school much of the work may be done in the arts and crafts room, or in the self-contained classroom itself.

(j) Design the stage with the idea of use by children rather than display for the public.

(k) Storage space for props, lighting equipment, etc., is needed.

The Stage in the Secondary School

The secondary school stage and auditorium are a different problem. Here we have a conflict of uses and needs. The high school principal wants an auditorium large enough to seat all the student body at one time. Suppose the student body is 1,800 or larger, as is



Roger Sturtevant

Raised classroom platforms, such as the one shown here in the Katherine Delmar Burke School, San Francisco, Kirby and Mulvin, architects, can add much to the day's activities.

frequently the case; or, as also happens, the high school auditorium is the only auditorium in the community. Here must be held those indoor events which will draw large audiences. Consider the high school commencement; there never seems to be enough space for all to be seated for this event. All these are legitimate needs and it is understandable if the community, investing its money in a new building, insists that they be met in some manner.

Yet, if we think of a functional stage for *educational* purposes, for creative dramatic experience and the use of the stage for productions by adolescent amateurs, the big auditorium concept is working against what we are trying to do. For educational purposes we need a *small* auditorium and a *large* stage. Whether every high school should have a large auditorium is debatable, but every high school should have a *good* stage and a small auditorium for educational uses primarily. Certainly the gymnasium-auditorium combination immediately rules out any chance of having a really functional stage.

The Good High School Stage

What do we need then for the *good* high school stage?

First, we need space. This cannot be overemphasized. We need space to perform without cramping the action or the scenery and property arrangement. We need space in the wings for placing of furniture and props for scene shifting. Space is also needed here for the cast waiting to go on stage—often there will be large groups. We need space to construct scenery and properties. A great part of the value of educational presentations is in the preparation of properties and scenery. Remember, we are not training professionals, but rather are helping children to grow. A stage workshop is a must for such activities

We need space to store properties, settings and costumes, and to store them safely and in some order. We need space for dressing and for make-up. So the number one requirement is enough space. If enough space is not provided at the time of construction, it can never be provided. Equipment lacks can be corrected gradually, but a lack of space is permanent.

Now, about the kind of space. First, the stage itself. A 30-foot proscenium opening is sufficient, but the commonly used 20-foot depth is not. The stage itself should be at least 30 feet deep. In back of the stage and separated from it by sliding fire doors should be the stage workshop. This should be a few feet wider than the proscenium arch and 30 feet or so deep. This, then, can be used for additional stage space to secure depth for exterior sets. The height of the stage should be a minimum of four feet more than the height of the proscenium arch. Fly galleries, grids and rigging are not essential. Let us use the cubic footage of the fly gallery for added floor space.

The ceiling should be equipped for hanging the cyclorama, curtain legs and borders, as well as lighting equipment. The stage floor should be of long-grained soft wood except for a hardwood apron.

Special Areas

Ample wing space should be provided. The commonly accepted formula, frequently violated, has been that the square footage of wing space, equally divided between the two wings, should equal the square footage of the stage proper. This is not enough, and to figure 50 percent in excess of this would not be too much. If the wings are large enough, wagon staging can be used more easily than flying flats.

One common make-up room is needed. This is

usually a long narrow room with make-up benches and mirrors along one or both sides. This room should have good general illumination as well as special lighting for the mirrors. Each mirror should have a light at head level on each side, with a shade which can be turned to send the light onto the mirror and indirectly onto the face of the person being made up.

For dressing purposes, several small dressing rooms to accommodate three or four people each are recommended instead of one large room for each sex. This will reduce pre-performance confusion and allow for much better concentration by the student actor. There should be a wash bowl with hot and cold water in each dressing room. Toilet facilities for each sex should be provided in this area. There should also be a shower for each sex.

The stage workshop should be as high as the stage itself. It should be equipped with cupboards or cabinets for storage of paint, paste, fabrics and other materials and tools for scenery construction. Racks should be provided for holding scenery frames while they are being worked on. Provision should be made for racks to hold the kind of lumber used in scenery construction. A concrete floor to stand hard usage and frequent washing is recommended.

The entire area should be equipped with automatic sprinklers. It should be separated by fire walls and fire doors from the rest of the school building. Local and state fire ordinances should be carefully observed.

The whole stage area should be located so that it is accessible to a school driveway. Wide doors (off center, if feasible) should be provided between the stage or the stage workshop and the out-of-doors for easy movement and handling of bulky stage equipment.

The stage and its wing space should be so located that large groups can get on and off the stage quickly into the school corridors.

Storage space should be ample, properly designed and properly placed. Those planning the stage should furnish the architect with a list of kinds of items to be stored. The architect, with the list and with continued help locally, will then have some chance of designing functional storage space with shelves, hooks, brackets, racks, etc., according to the needs. Ventilated storage space is needed for costumes. In general, storage needs multiply as time goes on and most stage areas soon run short of storage space.

Lighting for the School Stage

The trend on the professional and community theatre stage is to do away with footlights and to light with borders, floods and spots. Probably footlights will not be used for school dramatic productions. However, we must remember that there will be many general stage uses for other than dramatic purposes, and for such general use footlights and border lights are useful and easy to handle. The footlights should be of the disappearing variety and substantially constructed. Overhead border lights are essential, as are side borders and portable flood lights.

Spot and flood lighting from the auditorium ceiling is needed and should be placed so that at head and shoulder level of the performer the lighting is at a 45-degree angle. This angle of 45 degrees gives the best control of shadow.

There should be ample convenience outlets on the stage to prevent the use of long cords. These outlets should be on enough different circuits to allow for independent switching and to provide for ample wattage without overloading. The entire electrical installation for house lights and stage lights should be controllable from a central panel located in the wings, carefully planned and labeled for easy and safe operation. From the standpoint of safety it should be possible to turn on enough light on the stage from any entrance to the stage so that one can see well enough to find his way to the central panel and to operate it.

Objective Is Educational

It is realized that the above treatment is suggestive rather than exhaustive. The perfect school stage has not been built yet. There is a wide opportunity for creative design. If we keep in mind the fact that our objective is educational rather than self-display, and if we inform architects personally regarding our objectives and our needs, such creative design should result and school stages, particularly those in secondary schools, should become more than platform space and more than a copy of the professional theatre.



Ward Studio

Regardless of size or budget limitations the homemaking department can be effectively furnished and equipped through wise selection.

EQUIPPING THE HOMEMAKING SUITE



by MARY KOHLER

Home Economics Teacher Trainer, Hilliards High School, Hilliards, Ohio

Miss Kohler holds B.S. and M.A. degrees from Ohio State University. She is a member of the staff of the university and teacher trainer for home economics student teachers at Ohio State. The training center is located at Hilliards High School, Hilliards, Ohio. Miss Kohler has also taught homemaking in Ohio high schools.

WHEN selecting equipment for the homemaking suite one must keep in mind the many phases of homemaking which will be taught and the varied ways in which equipment can contribute to the effectiveness of teaching the different units in a homemaking program.

Homemaking, as it is taught in our schools today, is not the same as homemaking taught ten or fifteen years ago. The recent years have brought with them a great change in family living. Realizing the effect that recent trends in housing, relationships and management have had upon family living, adjustments and changes have been made in homemaking courses to meet the needs of the girls living in this changing society and to prepare them to live a happy, satisfying and worthwhile life in relation to themselves, their homes and their community.

No longer is the homemaker spending twenty-four hours a day in the home. Frequently she is engaged in part-time or even full-time employment. There are many new problems with which the homemaker is confronted and our homemaking program can no longer be concerned with just the fact that a girl be able to produce a good product, understand the process and have a knowledge of principles involved.

In addition to these factors the program must provide her with facilities for understanding and practicing management and relationships. Provision must be made for weighing advantages and disadvantages and opportunities provided for decision-making. To illustrate: in foods class the preparation of a standard product is not sufficient. The girls should understand the principles involved in the cookery, nutritive values, the pros and cons of the many available aids to quick cookery, such as modern mixers, etc., the advantages and disadvantages of various types of cooking equipment and the essential points in the selection of equipment and in management of time and energy. The same idea applies to clothing, home furnishing, laundry and every unit of our homemaking courses.

Equipment to Facilitate Teaching

Much emphasis should be given to the teaching of management, relationships and decision-making. The equipment which we select for our department must facilitate the teaching of these important phases of homemaking.

When deciding upon the equipment needed to make our teaching effective, one of the foremost limitations may be the amount of available space in the homemaking department. Our problem then is—how can we equip this space, regardless of size, to carry out our philosophy of teaching? In the small school this can be done efficiently in the one-room department. In the city school, where enrollments are large, probably a series of laboratories will be provided.

Whether homemaking is taught in a one-room department, a two-room department or a series of laboratories, there are certain basic factors which should be considered when selecting the equipment for the homemaking department.

Basic Factors to Consider

Equipment should vary as to type and make. By selecting a variety of one type of equipment such as sewing machines, ironing boards, ranges or refrigerators rather than having all of the same type, the girls will have the opportunity to actually use the different types, judge the advantages and disadvantages of the various makes, and arrive at some decision concerning them. True, it is much easier for the teacher and less time-consuming to teach a class to use one type of sewing machine or one type of range, but the teacher who prefers to equip her clothing room with ten sewing machines of the same make, or her foods room with like ranges, is placing the emphasis upon the finished product and not upon learning.

There should be provision for change in equipment. No longer is equipment placed in the homemaking room with the idea that it is to be there forever. It is necessary for us to keep up with the changes in modern furnishings and provision must be made to replace outmoded equipment with newer types.

Equipment in the homemaking department should be on different economic levels. What better opportunity could we give to girls to realize advantages and disadvantages and make decisions concerning the value of the equipment in relation to cost, than to give them the real test of actually working with the different grades?

The care and ease of cleaning should be considered when selecting equipment. To uphold the standards of our department and to practice what we teach, our rooms and all furnishings should be kept meticulously clean at all times and equipment should be selected with this thought in mind.

Placement and relation to other equipment should be considered. The arrangement of all equipment within our department should be such that it will teach and impress the girls with the value of efficiency and the management of time and energy.

The equipment in the school should have a direct effect upon the home. There is nothing more gratifying to the teacher than that there be a carry over into the girls' homes. Students should be given the opportunity to work under conditions such as proper working heights, effective arrangements of cupboards and equipment, which will make them aware of the relation between good working conditions and physical well-being. With this realization, there will be a transfer to the home.

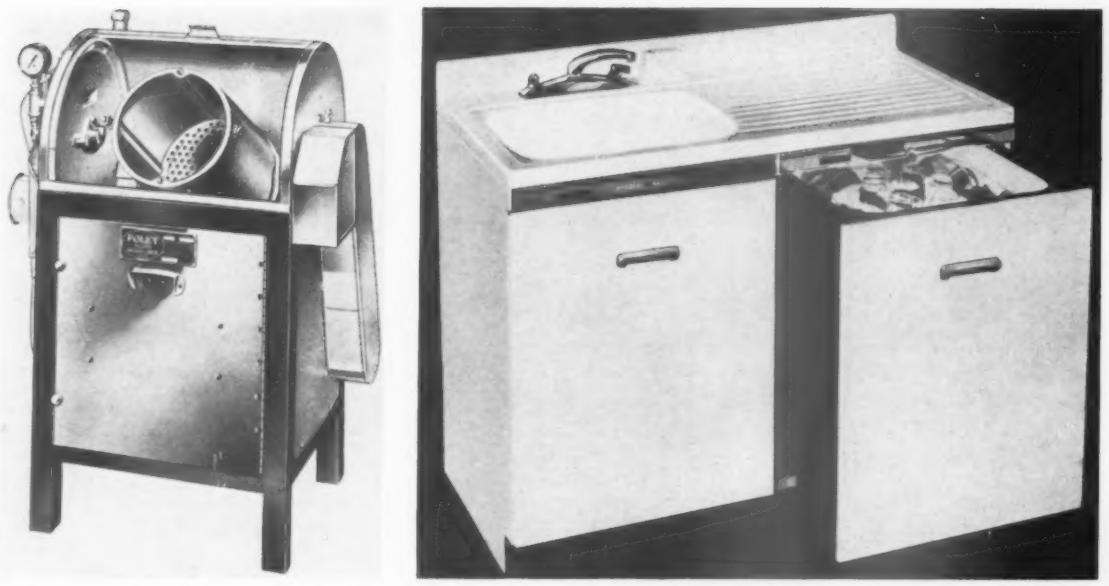
Jaeger and Earl



If possible, it is advisable to have a different make refrigerator for each two-unit kitchen.

Provision should be made for sufficient working space. With the current equipment replacement plan, there may be competition between commercial firms. With this opportunity of obtaining more equipment, there is danger that efficient working space may be sacrificed to accommodate some unnecessary, new and beautiful equipment. It is the duty of the homemaking teacher and the superintendent to decide what equipment is vital and necessary for purposeful teaching and to make certain that the department is not equipped simply for display or show. Equipment cannot be justified when it has been the means of eliminating space required for efficient methods of work. Very often more working space may be acquired simply by shifting positions of some of the larger pieces of equipment.

Aesthetic values should be considered when furnishing our homemaking room. Our department should exemplify the principles for which we stand. What the



Foley

Modern washers for dishes (right) and silver (left) may prove of value to those enrolled in homemaking or consumer buying courses.

room is, affects the girls more than any lesson we might attempt to teach. Certainly then, color, arrangement of furniture, selection and hanging of pictures and curtains become vitally important aspects of the homemaking program.

With these basic factors in mind one can readily understand the importance of selecting the furnishings to equip the homemaking suite.

Facilities for Teaching Foods

It has been agreed that unit kitchens containing a range, cupboard, sink, working space and serving table, the necessary equipment for a family of four to six, are by far the most effective arrangement for teaching foods. They lend surroundings which are very similar to those found in a girl's own kitchen at home.

Ranges. Since one of our objectives is to have the girls become acquainted with various types of equipment, we must equip our kitchens so that they have an opportunity to use many different makes of ranges. As an example, when five ranges are required for five-unit kitchens some should be gas, some electric, etc. depending upon the fuel used in that particular community. Some of the ranges should be regular size, some apartment size, some the popular "30" oven or the sectional range. Here is an excellent opportunity to incorporate consumer buying in a foods unit.

Refrigerators. It is advisable to have a refrigerator for each two-unit kitchen. These, too, should be of different types. One might be gas, one electric; one might have a different type freezer chest. Certainly one should be self-defrosting.

Home Freezers. With freezing being recognized as an outstanding method of food preservation, no foods laboratory is fully equipped without a home freezer. The final decision as to whether it should be an upright or chest type may be determined by the space available in the laboratory. The home freezer serves to:

1. Give girls actual experience in freezing foods.
2. Teach management of time and energy by preparation and freezing of foods for meals which will be served later in the unit.
3. Facilitate preparing and serving meals by the previous preparation of frozen foods.

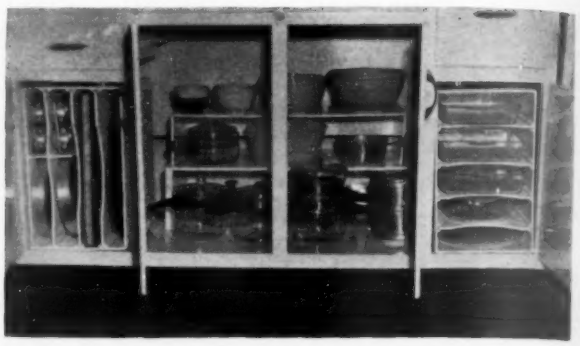
Dish Washers and Disposers. The modern kitchen is equipped with a dish washer and disposer. As a tool for decision-making and the consumer buying unit, it would be valuable to have one kitchen in the foods laboratory furnished with these electrical devices. However, we must realize that they do have limitations for the school laboratory, two of these being the cycle of time required for operation and the usage of space which might be utilized more effectively in another capacity.

Small Equipment. The small equipment which is necessary for food preparation should vary in each kitchen both as to type and cost. The teacher should plan for a definite system of rotation for the members of the class, so that they will have the experience of working in the various kitchens. As classes rotate from kitchen to kitchen, students should have the opportunity to cook with aluminum, glass, cast iron, stainless steel or tin. It is an excellent idea to have one kitchen equipped with very inexpensive equipment. Through experience, the girls will learn that it is not wise to buy an inexpensive paring knife, but the purchase of an inexpensive tin pie pan may be a good buy since it will

Tobias Studio



This conventional cupboard has traditional spacing of shelves with the resulting waste of valuable space.



The same cupboard after space has been utilized by a step-up shelf, horizontal and vertical files.

produce just as good products in baking as more costly pie pans. There is no better method of teaching comparison, selection and care of equipment. Only after a girl has used these different types in food preparation and cared for them, can she intelligently judge the utensils, weigh the advantages and disadvantages and decide whether they are the type she would select for her own home.

Serving Tables. Serving tables at which the family of four to six may eat are a necessity for each unit. Although there may be a dining room as part of the homemaking suite, this will never take the place of tables where the girls may serve and eat the food which was prepared in class. When space is a limiting factor, slide in shelves or drop leaf tables may be the solution. Without this means of serving food how can the girls practice correct serving, table setting, manners and etiquette?

Utilize Cupboard Space Fully

Cupboard Storage. There should be not only sufficient cupboard space for storage of all dishes, silver and necessary equipment in each unit, but the cupboards should be arranged to utilize all horizontal and vertical space to the best advantage. This will eliminate stacking of unlike dishes or stooping and searching for a nest of mixing bowls, thus saving many minutes and countless energy. Since most of the cupboards are the conventional type with a standard amount of space between shelves, it becomes the duty of the teacher to plan for the most effective utilization of this space. Insert shelves, half shelves, vertical and horizontal files and removable sectionings for drawers are just a few devices which can be employed successfully. Space should be provided for proper storage of the girls' aprons. How can girls be well groomed when their aprons must be crowded into a drawer or compartment? If the department were large enough, space for hanging the aprons would be ideal.

Working Space. One cannot overemphasize the necessity of sufficient working space in the kitchen. Working heights in the kitchen should vary. Pull out working boards at various levels facilitate the solving of this problem. The variance in heights has several values:

1. The short, medium or tall girl will have the opportunity to work at a comfortable position.
2. As the girls rotate from kitchen to kitchen, they will become aware of the importance of the correct working height and its relation to fatigue or physical well-being.

Working surfaces should vary as to composition. Different patterns of formica, stainless steel or linoleum would serve as another excellent lesson in consumer buying and afford another opportunity in decision making.

Colors. The time spent in the foods laboratory should be a happy experience and the right, attractive coloring can contribute much to the atmosphere of the room. A variation of color in each kitchen, yet having a unified "over all" effect is one means of adding attractiveness and interest to the laboratory. The colors selected would to a great extent depend upon the natural lighting of the room. A variety of colorful dishes and place mats add to the general interest and offer the girls an opportunity to select pleasing color combinations.

Chalkboard and Bulletin Board. A chalkboard and bulletin board are indispensable in the laboratory. Many a lesson may be taught by the effective use of the bulletin board. The chalkboard should be a generous size and placed so that it can be seen easily by the class.

Laundry Equipment

Laundry equipment may be placed in a separate room or may be an integral part of the foods laboratory. An automatic washer, drier and power ironer (each of a different make if possible) are an important part of the homemaking department. With this equipment girls may practice further duties of the homemaker. Dish cloths, towels and table linens are not hung over a rack or packaged for the laundry, but are

washed, dried and ironed by the girls. This affords not only the opportunity of using the equipment, but gives the girls a more vivid appreciation of management of time and energy. These three pieces of equipment serve as the main incentive for the laundry unit in which the girls bring in family laundries, taking them home after they have been washed, dried and ironed. The adjustable ironing board, hand iron and steam iron, which are a part of the pressing equipment, may be borrowed from the clothing department for this unit.

The Clothing Department

Tables. Just as working space of different heights was recommended for the foods laboratory, so the tables which supply the working space in the clothing room should be of varying heights. Sufficient working space for four girls should be provided at each table. Drop leaf tables will expand the working surface.

Sewing Machines. Authorities agree that there should be one sewing machine for at least every two girls. To promote further learning the machines should be of various types and makes.

Pressing Equipment. Space for pressing should be planned for various parts of the room. Ironing boards should be of adjustable heights and the irons, including steam irons, should be of different types. These will be valuable not only in this unit, but in a consumer buying unit with advanced classes. If space is not available for several pressing units, small pressing boards could be provided and used on available working space. There should be sufficient electrical outlets so that irons could be used at several places in the room.

Storage Space. Ample storage space in the clothing laboratory is needed for:

1. Garments in the process of construction while work is flat and for garments in a stage of completion and ready for hangers.
2. Individual supplies used for sewing.
3. General supplies.
4. Illustrative materials.
5. Reference books. Closed cupboards should be provided for those books not being used and open shelves for the books which are in current use.
6. Pressing equipment. One cupboard should accommodate all pressing equipment.

Fitting Center. Some part of the room that is well lighted, fitted with mirrors and offers sufficient space and privacy may well be used for the fitting center. To utilize space triplicate mirrors are sometimes placed on cabinet doors which, when opened, serve as a fitting space.

Arrangement of Equipment. Because modern speed up methods are used in clothing construction, the trend at the present time is toward the unit arrangement of equipment so that all equipment is accessible to the worker without excess expenditure of time and energy. In an attempt to improve the efficiency of the clothing laboratory, the Stout Institute, Menomonie, Wisconsin, has planned a specially designed unit which contains working space, sewing machines, pressing equipment and individual supplies for two girls.*

This arrangement seems ideal, but again, space and cost are limiting factors in high school departments. However, just as we plan unit arrangements in the kitchen, a unit arrangement of storage space, pressing equipment, sewing machines, working space, etc. could be worked out in any homemaking department. The size of the average high school class and size of the room makes it advisable to plan each unit to accommodate four girls.

Lighting. The value of correct and adequate lighting in the clothing room cannot be overestimated. In this room the girls are constantly using their eyes to follow close work. Insufficient and incorrect lighting has direct effects not only on the health of the girl, but on the standard of her work.



Jaeger and Earl

An automatic ironer is a welcome addition to the laundry unit.

Child Development

In a large school where a nursery may be an integral part of the school, homemaking classes have an excellent opportunity to cooperate and integrate their work with the nursery school. This means that facilities for the unit would be available and storage would be no problem. In the smaller school where this is not possible, accessible and sufficient space should be provided for storage of needed equipment.

* Alice Kirk, "Improved Clothing Laboratories," *Journal Home Economics*, Vol. 42, 1951, pp. 426–7.

It should be planned to have flexibility in the room so that the tables may be moved in any desired position and the room may be easily rearranged for effective presentations, demonstrations, observations, discussions, laboratory practice, etc.

Home Nursing

At the present time in many localities the American Red Cross is cooperating with the homemaking department in offering the services of a trained nurse to come to the school, bringing all equipment with her, to teach home nursing. Again, flexibility of the room assumes great importance.

However, the present trend seems to place the responsibility of teaching this unit upon the local teacher. Plans are being made by which prospective teachers will receive training to enable them to present the course. With this plan equipment and storage of equipment will become a vital factor. A single cupboard which would be large enough to hold a roll away bed and other supplies needed for this unit should be provided.

Home Furnishing

As someone has said, "What you are speaks so loudly, I cannot hear what you say," applies directly to our homemaking department in relation to the unit on home furnishing. The curtains, pictures, plants, arrangements of books, teacher's desk and other furniture should exemplify the principles we are trying to teach. Our room and its furnishings become a workable laboratory.

This does not imply that the furnishings should be costly. By exercising wise selection many items that will illustrate the principles of proportion, line, color, design and balance may be secured at a nominal cost. If possible, there should be some actual space where facilities are provided for refinishing and upholstering furniture.

A Separate Living Center

It would be an ideal situation to have a separate room for a living center. As a place where entertaining would take place, it should be located conveniently near the kitchen to facilitate serving of food. This room differs from the classroom in that furnishings are similar to a modern living room and surroundings are conducive to informality.

The possibilities of use of the living center are many. Here would be a perfect setting for experience in various types of entertaining; a place for boys and girls to meet informally for classes in relationships; ideal surroundings for working with children in small groups; a room in which girls could put to practice the principles of interior decoration such as refinishing furniture or arrangement of furniture and a place of privacy for the teacher and pupil to discuss problems and have conferences.

If a separate room is not available the same effect can be derived by arranging an informal grouping of furniture (table, comfortable chairs, lamp) in one part of the homemaking room. If provision is made for a living center, it should become a vital part of the teaching and should at all times be clean and attractive.

Visual Aids and Display

With more and more emphasis being placed upon the use of visual aids as a teaching device, a screen or wall space for the projected picture should be an essential part of the homemaking equipment and provision should be made to darken the room if necessary. Having a projector in the department assures the use of it at the opportune time.

The display case can be an excellent means of publicity for the homemaking department. To be an effective device certain factors must be kept in mind:

1. It should be located where it can be seen by pupils, teachers and visitors.
2. Every exhibit and display must be worthwhile and must be a teaching device.
3. Exhibits should be kept in the display case at all times and should be changed frequently.
4. The arrangements and contents of the display case should be planned and carried to completion by the pupils.

It would be far better to dispense with the display case than to use it ineffectively.

Space and Cost Often Limited

It would be ideal to have a homemaking suite in which space and cost would not be limiting factors. We do realize that a homemaking department is a costly department and that spacious quarters are not often available.

However, regardless of the size of the department and limitations of the budget, with wise selection and efficient arrangement many of the facilities which have been considered in this article can be incorporated into any homemaking department.



Food cart, shown here, is placed in position in the serving line of the school cafeteria. The airtight top is removed and the cart becomes a part of the serving line. Each of these carts serves 300 students. It takes less than 30 seconds to change carts.

A CENTRALIZED KITCHEN FOR SCHOOL LUNCH PROGRAMS



by HENRY L. WRIGHT

AIA, Kistner, Wright & Wright, Architects & Engineers, Los Angeles, California

Henry L. Wright attended the University of California at Los Angeles and the University of Southern California. His firm of architects specializes in school planning and design. During 1953 Mr. Wright was president of the Southern California Chapter of the American Institute of Architects. He is chairman of the Education and Research Committee, California Council of Architects.

THE idea of centralized food preparation facilities for school lunch programs is not a new one. It has been used for many years by industry in aircraft factories, large manufacturing plants and in hospitals. Such operations vary somewhat, but basic principles are the same for both industry and schools.

There are centralized school kitchen installations in a number of Southern California school districts and these have been operating successfully for many years. Each district, however, has tailored its central kitchen operation to its own requirements, which is as it should be. In one district a central kitchen was established at each junior high school where meals are prepared for elementary schools in the junior high attendance zone. Here the meals are being served in classrooms and open shelters because funds are not available for constructing lunchrooms. Another district has its central kitchen prepare only the main dishes. Each school completes preparation of the meal in its own separate kitchen.

As everyone knows, the success of any cafeteria operation depends greatly upon participation by students. Meals must be attractive and tasty as well as nutritious, served quickly without confusion and, most important of all, priced at a reasonable amount so that all can afford to eat in the cafeteria, if the benefits of a school feeding program are to be realized.

A Problem Solved for Norwalk

A most successful centralized kitchen or food preparation facility is now operating in the Norwalk City School District about 20 miles south of Los Angeles. The writer has had the pleasure of participating in its planning. This district, in 1945, had one school with an enrollment of approximately 650 students and operated one cafeteria. During the last eight years the enrollment has increased to about 8,000,

with 11 schools, and prospects of 14 more in the next three years.

If the district was to continue its well-established feeding program of low cost, high quality meals, something had to be done to reduce the cost of constructing and operating separate cafeterias at each school. This cost would have been prohibitive in relation to the district's income for both building construction and operation costs.

After investigating similar operations in other districts, it was discovered that no one school district visited had solved the problem in a way that would fit Norwalk's particular needs. Drawing from such past experiences and adding certain special requirements, the superintendent, Mr. R. D. Benton, the business manager, Mr. Bruce Butler, and the writer determined certain basic principles to be followed:

1. All food was to be prepared and stored at one location.
2. The menu was to be the same for all schools served—nutritious, attractive and at the same price offered in the past.
3. Transportation of meals from central kitchen to each school was to be arranged so that food in sufficient quantities could be conveniently delivered hot and on time.
4. The serving facility at each school would be designed to afford rapid serving in adequate lunchrooms.

Location of the Central Kitchen

The central kitchen is located in the approximate geographical center of the district. This is not essential, but obviously desirable. The longest travel distance, when all new schools are constructed, will be about three miles. A large food storage area is provided with loading dock, ample shelving for dry storage and walk-in refrigeration for meats and vegetables.

The central kitchen is equipped to prepare 2,000 to 3,000 meals a day. Provisions have been made for future expansion when the production of more meals is required. All areas are on the same level to facilitate the loading of "food carts" with prepared food and then placing the carts on the truck for delivery to each school. Dishwashing facilities are provided for washing food containers and pots, pans and utensils.

Concrete floors throughout are included for both economy and ease of cleaning. There are high clerestory windows on opposite sides of the kitchen for both ventilation and high daylight levels. This allows a maximum of wall surface for arrangement of working spaces and storage. A large area is included for storage of food carts when they are not at the schools. Here they can be cleaned, or loaded with food and kept hot prior to delivery.

Personnel Involved

The kitchen now prepares 2,000 meals daily with a total of eight persons needed for food preparation. Personnel consists of a central kitchen manager, baker, head cook, salad maker and four cafeteria helpers. This is all that is required for the feeding program now offered. However, experience has shown that as the volume increases, personnel will not increase proportionately.

Last year 42 percent of those children eligible to purchase meals in the cafeteria participated; only those not on double session were ineligible. A sample one-week menu prepared at this facility will illustrate the type of meal (costing 25¢) included in the feeding program and for which the planning of this kitchen provides:

Monday

Barbecued Meat over Mashed Potatoes
Buttered Peas
Shredded Lettuce & Pineapple Salad
Bread & Butter Sandwich
Chocolate Pudding
½ Pint Milk

Tuesday

Chili & Beans
Buttered Spinach
Pear & Grated Cheese Salad
French Bread W/Butter
Chocolate Cake
½ Pint Milk

Wednesday

Beef Stew W/Fresh Veg.
Boiled Potatoes
Hot Yeast Rolls W/Butter
Peaches
½ Pint Milk

Thursday

Spaghetti W/Meat Sauce
Hot Spiced Beets
Green Salad
Bread & Butter Sandwich
Pumpkin Chiffon Square
½ Pint Milk

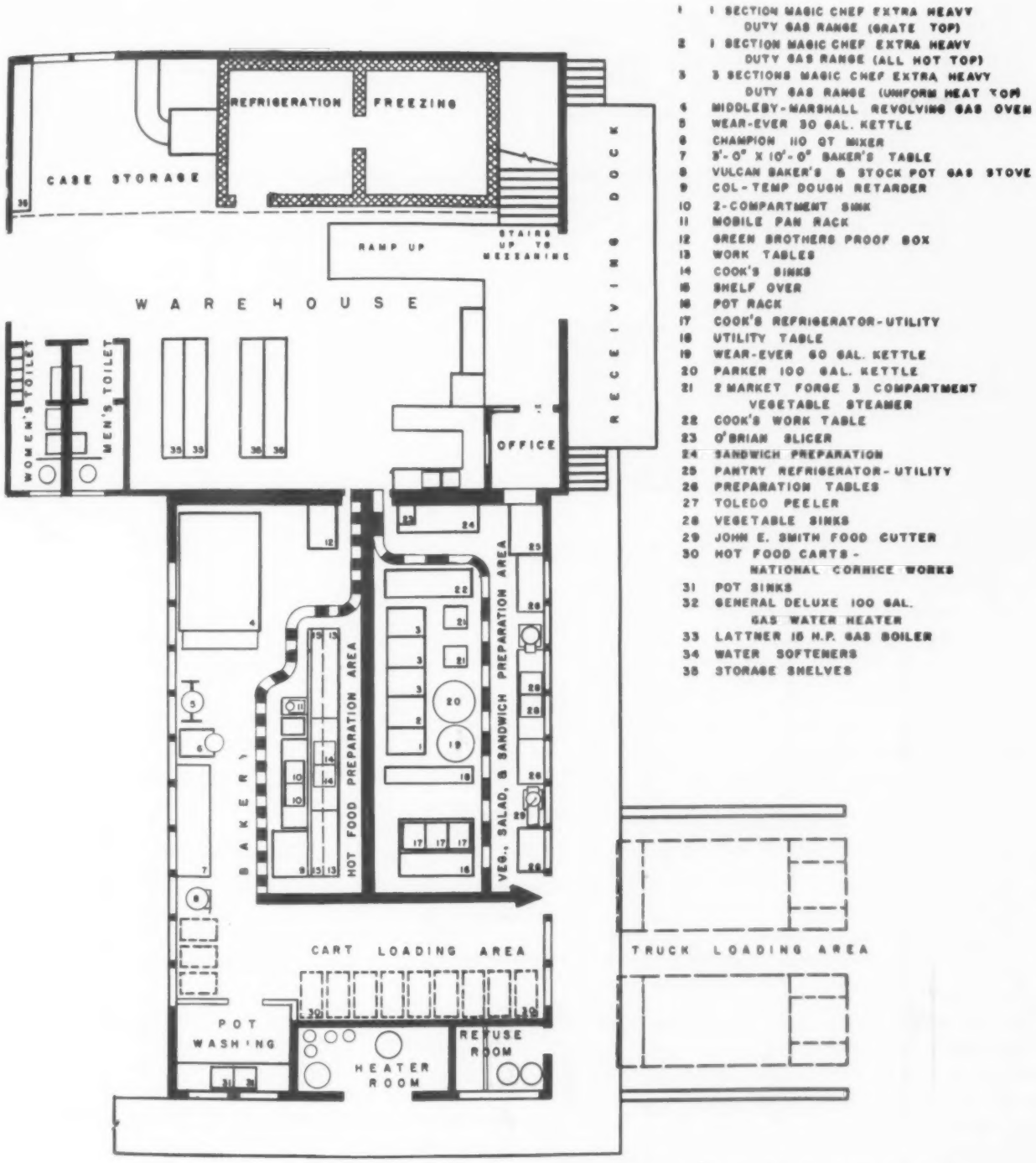
Friday

Baked Fish W/Tartar Sauce
Parsley Boiled Potatoes
Fresh Mixed Veg. Salad
Whole Wheat Bread W/Butter
Peanut Butter Cookies
½ Pint Milk

The Portable Food Cart

The portable food cart was designed to hold from 250 to 300 meals. It has well-insulated compartments to store hot foods and to retain heat in transit and while serving. Space for cold dishes such as salads and desserts is also provided. The storage compartments have interchangeable racks for flat pans and circular containers with tops for liquid foods. One insulated compartment remains at room temperature. When the cart arrives at the serving kitchen salads and desserts stored in this compartment are placed in a refrigerator until lunch time.

The top of the food cart is used for serving. In-



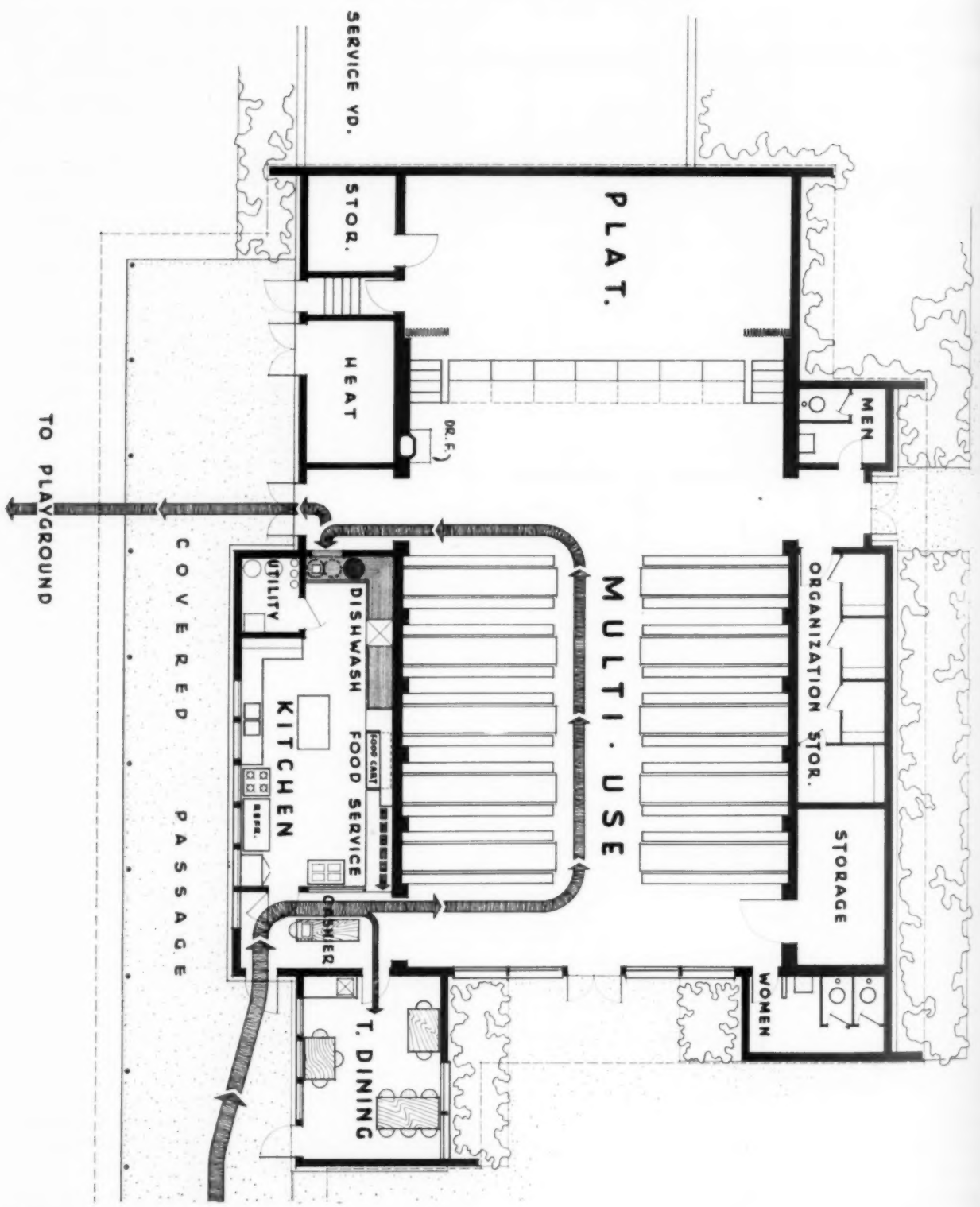
1 1 SECTION MAGIC CHEF EXTRA HEAVY DUTY GAS RANGE (GRATE TOP)
2 1 SECTION MAGIC CHEF EXTRA HEAVY DUTY GAS RANGE (ALL HOT TOP)
3 3 SECTIONS MAGIC CHEF EXTRA HEAVY DUTY GAS RANGE (UNIFORM HEAT TOP)
4 MIDDLEBY-MARSHALL REVOLVING GAS OVEN
5 WEAR-EVER 30 GAL. KETTLE
6 CHAMPION 110 QT MIXER
7 3'-0" X 10'-0" BAKER'S TABLE
8 VULCAN BAKER'S & STOCK POT GAS STOVE
9 COL-TEMP DOUGH RETARDER
10 2-COMPARTMENT SINK
11 MOBILE PAN RACK
12 GREEN BROTHERS PROOF BOX
13 WORK TABLES
14 COOK'S SINKS
15 SHELF OVER
16 POT RACK
17 COOK'S REFRIGERATOR-UTILITY
18 UTILITY TABLE
19 WEAR-EVER 60 GAL. KETTLE
20 PARKER 100 GAL. KETTLE
21 2 MARKET FORGE 3 COMPARTMENT VEGETABLE STEAMER
22 COOK'S WORK TABLE
23 O'BRIAN SLICER
24 SANDWICH PREPARATION
25 PANTRY REFRIGERATOR-UTILITY
26 PREPARATION TABLES
27 TOLEDO PEELER
28 VEGETABLE SINKS
29 JOHN E. SMITH FOOD CUTTER
30 HOT FOOD CARTS - NATIONAL CORNICE WORKS
31 POT SINKS
32 GENERAL DELUXE 100 GAL. GAS WATER HEATER
33 LATTNER 15 H.P. GAS BOILER
34 WATER SOFTENERS
35 STORAGE SHELVES

Central kitchen of the Norwalk City Schools, California. Architects are Kistner, Wright and Wright of Los Angeles. This kitchen is equipped to prepare 2,000 to 3,000 meals each day.

serts are provided for both round and rectangular pans. Buttered bread, cakes, etc. are stored on the cover of the cart during transit and are removed and set aside upon arrival.

The carts, when loaded, weigh between 500 and 600 pounds. They have swivel, ball bearing hard composition 3½-inch diameter casters for ease in handling, and a protective rubber covered bumper projecting around the entire periphery to protect both cart, door jambs and other surfaces while moving about. The cart is narrow enough to easily pass through a three-foot door, and fits into a space provided at each service kitchen where an electrical connection and cable keep the food hot while it is being served.

A short wheel base cab-over van truck, completely enclosed and equipped with a hydraulic tail gate, is used to transport the food carts from the central kitchen to each serving kitchen. The hydraulic



Multi-use building of the Norwalk City School System which is used for food service. This unit is planned for many other activities in addition to serving lunches to children and teachers. Teachers' dining room is at right.

tail gate enables the driver to unload the cart at any level below the truck bed, thus eliminating special loading provisions at each school. The truck holds six carts at one time, and about one hour is required for the two trips needed to serve eleven schools.

When the driver is not delivering or picking up the food carts, he assists at the central kitchen in cleaning, pot washing, handling food cartons, etc. When the food carts are picked up at each school, the lunch money is also picked up. The money is kept in a zip-

pered, locked money bag which is deposited at the bank unopened at the end of the day.

Serving Kitchen and Lunchroom

In the Norwalk City School District, as well as in many school districts in California, the serving kitchen and lunchroom are included as functional areas of a multi-purpose school building where there are facilities for many other activities, not just feeding alone.

During the planning of these multi-purpose school buildings over a period of three years many detailed changes were made to rectify earlier mistakes and to provide more workable plans, as experience in using these buildings indicated. The design planned for Norwalk incorporates all of the desirable features learned to date.

The serving kitchen now occupies about 600 square feet, and is located conveniently for children entering the lunchroom from their classrooms, as well as being easily accessible to the driveway for deliveries.

Minimum of Equipment

The serving kitchen equipment is kept at a minimum, but is adequate for preparing occasional community dinners for the PTA and other local groups. There is a 40-cubic-foot refrigerator for milk storage. Milk is delivered directly to each school to avoid double handling. The refrigerator also holds cold foods that arrive from the central kitchen for each meal.

A small apartment-size domestic gas range is provided for local food preparation, and also a two-compartment sink with drain boards on each side for rinsing containers as they are emptied during serving. This is important because it expedites the washing of these containers when returned to the central kitchen. Minimum cupboard storage is provided for dishes and utensils needed for local community functions.

Complete dishwashing equipment is placed in the kitchen adjacent to the soiled dish return port. Food is served on divided trays, milk in wax paper containers with a straw, and only the necessary knives, forks and spoons provided. Water is obtained at drinking fountains in the lunchroom.

How the Meal Is Served

The serving area allows for a one-point pick-up which reduces the long counter spaces usually needed for a conventional cafeteria operation. The child pays his money to the cashier before receiving his meal, thus eliminating the necessity for him to have a hand free to make change. The cashier supervises the picking up of milk, straws, silver and napkins after payment is made for the meal. The tray of food is received last before the child enters the lunchroom.



Exploded view of the portable food cart. Insulated compartments store hot foods and spaces for cold dishes are also available.

Experience has shown, after many other procedures have been tried, that the fastest service can be obtained by this method.

Sixteen feet long in-wall tables and benches are provided and can be folded back into the wall when the lunch period is over.

After the meal is finished, the child leaves the lunchroom by way of the soiled dish port. He deposits his tray and utensils at the dish port and paper napkin, straw and milk container in a trash barrel mounted on a portable dolly. This is removed at the end of the lunch period.

The kitchen is planned so it may be closed off from the lunchroom at the end of the lunch period. The large room can then be used immediately for other school activities.

To make the lunch program attractive to the school children, various groups enter the lunchroom at 10-minute intervals. Meals are served rapidly and long lines of impatient children waiting to eat and get out onto the play yard are avoided.

Teachers' Lunchroom

Teachers receive the same meal and stand in the same lines as the children. They have a lunchroom of their own, however. Here about one-half of the faculty may be seated at one time. A drinking fountain and electric coffee makers are provided.

Personnel required at each serving kitchen consists of two adults. One serves as cashier and the other manages and supervises food service. Student



Southern California Gas Co.

The mobile food cart is designed to hold food at serving temperature for two hours.

helpers assist in filling trays and in washing trays and utensils. Students are paid an hourly wage and are not given a free meal. They work only during the lunch period. Women are recruited from the surrounding area and put in a very short day, about four hours for the manager and only one hour for the cashier. Divided serving trays and silver are washed and stored at each serving kitchen and not returned to the central kitchen. In this way the cost of washing and handling is kept to a minimum.

Advantages of the Central Kitchen

Some of the advantages of central kitchen food preparation may be summarized as follows:

1. Central preparation of food results in volume production and enables the school district to provide a better meal for the same price as that offered by many preparation kitchens, and more often the same meal for a lesser price. Also, there is the possibility of keeping at a minimum the district subsidy of the cafeteria program.

2. The problem of using left-overs is minimized by returning these to the central kitchen where they are used to best advantage.

3. Economies are effected by large quantity production with a minimum of personnel.

4. Complete control is maintained of quality meals and their preparation.

5. Complete control of purchasing, receiving and storage of food is possible.

6. Building areas on a district-wide basis can be reduced, thus cutting total district building costs.

7. Equipment costs are considerably less and more efficiency in the use of equipment is effected.

Those school districts which have adopted the central kitchen system report they are well satisfied with this type of operation. The plan, however, will not work successfully without full cooperation by all those involved in its planning and operation. Its limitations are few and adjustments can be made easily if those responsible for its operation are sympathetic with the program.



The Lenthal School in Newport, Rhode Island, was first constructed in 1886. After extensive modernization this building is still in use. The photographs which follow reveal how the school was modernized for continued use.

MODERNIZING THAT OLD ELEMENTARY SCHOOL BUILDING

by CARL H. PORTER-SHIRLEY

Superintendent of Schools, Newport, Rhode Island



Mr. Porter-Shirley has a B.S. from the Bridgewater, Massachusetts, State Teachers College and an M.Ed. from Rhode Island College of Education. He has held positions as principal and superintendent of schools in Connecticut, Massachusetts and Rhode Island. Mr. Porter-Shirley has fulfilled his present office since 1948.

and DAVID ALDRICH

Architect, Providence, Rhode Island



Mr. Aldrich has a Ph.B. degree from Brown University and a B.Arch. degree from the Columbia University School of Architecture. He was a partner in the firm of Kent, Cruise and Aldrich for four years prior to World War II. During 1942–1945 Mr. Aldrich served with the U.S. Army. Since 1946 he has been a partner in the firm of Creer, Kent, Cruise and Aldrich.

SCHOOL buildings are seldom renovated and even less frequently modernized. In fact, after buildings go up little provision is ever made to keep them up-to-date in the light of new teaching methods and practices. Worse still, few attempts are being made to modernize school buildings to conform to the progress made in recent years in lighting, ventilation, heating and sanitary measures.

Causes for the run-down condition of school buildings, a normal situation in most communities, may be numerous. However, with the advent of increased school population attention to older buildings has become imperative. These old school buildings, once scheduled to be replaced, must now continue in use for years to come. Consequently, a planned program of modernization rather than one of renovation becomes essential.

However, the enthusiasm of taxpayers to modernize schools is often lacking because many have attended these same schools and do not realize the necessity of continuous modernization of the buildings. The first order of business is to demonstrate and substantiate this need.

This can be accomplished by using such tools and devices as the Engelhardt-Leggett or the MacCleary School Building Score Card, the construction of one model classroom to show contrasts and planned visits to new or modernized schools. If these projects are initiated with the active participation of representative citizens, greater support will be found for financing the program.

Planning the Program

Regardless of the approach, the program of planning should include:

1. Renovations to make school buildings safe with



Gleaming lunchroom of the Lenthal School in Newport, Rhode Island, is located in the basement of the building. View of the basement before modernization is shown below.



adequate ventilation, heating and lighting systems.

2. Changes to make additional desirable areas available.
3. Adequate sanitary provisions.
4. Facilities to promote better instructional procedures.

The next step is to translate desired renovations, changes and facilities in terms of plans, specifications, costs and completion dates. Since modernization of school buildings can best take place during vacation periods, the programming of work becomes increasingly important. It may be desirable to phase the completion of work over a two or three-year period. In any event, drawings and specifications for the work should be available to the contractor so that materials may be on hand to begin the work promptly at the close of a school year.

Consideration of Safety Factors

A school building should be structurally sound. Structural members, floor joists and uprights need careful examination. School buildings differ in rate of deterioration and such an examination may well be the determining factor as to whether or not the building should be abandoned. If it is to be used for school purposes, it must be completely safe for occupancy.

Fires often start as a result of carelessness (accumulation of oily rags or waste); defective heating equipment; or defective electrical wiring or fixtures. Assuming that fires start regardless of cause, pupils and teachers must be able to reach stairwells which allow passage without the danger of inhaling smoke or fumes. Fire screens to eliminate open stairways are a must in any school, otherwise the building is a firetrap.

The installation of fireproof stairwells is always recommended. A wood stairwell may be the place of origin of a fire and become a natural vent, thus increasing the velocity of the fire. Alternate exits must also be devised in the event any stairway becomes inaccessible. Fire escapes and exits to other classrooms may be necessary in the modernization plan.

Replacement of the wiring system is recommended to insure safety. Old wiring may have insulation that has become brittle. Then, too, with the need of new lighting fixtures, new electrical outlets may mean additional loads and balancing. Many old buildings have 14-gauge wiring which is too small for carrying these additional loads. Size 12-gauge wiring is recommended, as well as the installation of new circuit panels. In this way any type lighting fixtures or electric appliances may be used.

A careful examination of the chimney should be made. Many chimney flues in old school buildings are in need either of repointing or the installation of flue linings. The boiler should be examined for cracks. Firing should be automatic with oil burners, unless the low cost of coal makes stokers desirable.

The condition of the existing ventilation system, as well as the heating system, will determine whether the installation of unit ventilators is desirable or whether direct ventilation by using window vents is preferable. The ventilating stacks or flues often become natural vents for spreading fire and may well be abandoned. If abandoned, vents should be blocked.



How classrooms once looked . . .



. . . before they were changed to this . . .



. . . and to this. Shown here is the reading corner of a reconverted classroom of the Lenthal School.

Most toilets are located in the basements of old school buildings. Every effort should be made to relocate these toilets in areas adjacent to classrooms and on each floor. The use of large cloak rooms or dead-end corridors should be considered for this purpose. Provisions for mechanical ventilation are usually necessary if toilets are relocated.

Wash bowls should be installed not only in the newly located toilets but also in lunchroom areas and, if possible, in each classroom. Drinking fountains should also be installed in lunchrooms and in classrooms. For reasons of economy drinking fountains can be installed next to the wash bowls but it is desirable to keep them separate if possible.

New Areas in Old Buildings

Many buildings contain considerable basement area. This area, if available, should be considered for the installation of school lunchrooms, arts and crafts areas, school museums or even small assembly halls. If any such renovation is contemplated, special attention should be given to mechanical ventilation requirements and to complete isolation of the heating unit area.

The need for additional classrooms, all-purpose rooms and even additional play areas should be an important consideration in the planning program. No additions to a school building should even be contemplated unless the older portion is completely modernized as part of the project.

Lighting Factors

The best type of artificial lighting is still a controversial issue. It is agreed, however, that indirect light, regardless of source, is most desirable for classrooms. In old school buildings where high ceilings exist, one good solution is the installation of a plastic ceiling at a nine to ten-foot level with light sources between

old and new ceilings. This is still in the realm of experimentation.

The use of concentric ring incandescent fixtures for classroom lighting has proved quite successful. The low cost of installation and minimum upkeep expense are factors which make this type of fixture desirable. However, ceilings must be kept clean. Kalsomined ceilings are recommended for their reflective value, original low cost and ease of repetitive resurfacing.

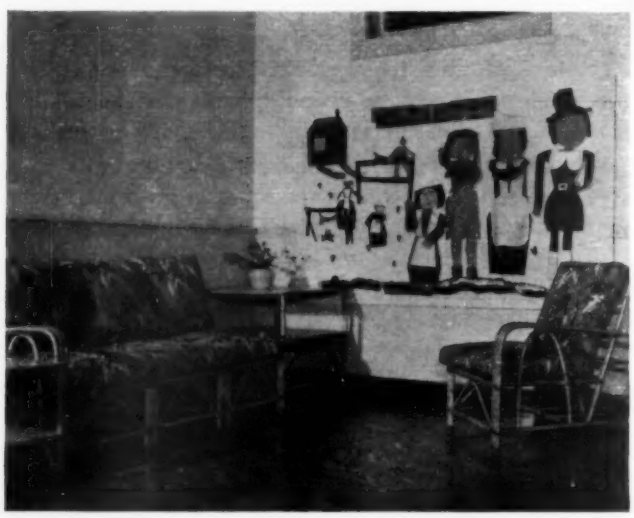
It has been noted that where six or more concentric ring fixtures are wired parallel to the windows, the inside row only is used most. This prevailing use allows the installation of 300-watt bulbs (even 500-watt in dark corners) without exceeding the cost of electricity for the old lighting installation.

Usually the structure of an old school does not permit additional window space. Therefore, artificial lighting installations should give approximately 20 footcandles in total darkness with careful attention given to brightness ratios. Aluminum venetian blinds have been found to control sunlight difficulties satisfactorily. The cost of venetian blinds does not greatly exceed other types of shade installations. Opaque shades can usually be installed behind the venetian blinds for audio-visual purposes.

Color schemes in a classroom may require specialized knowledge in order to provide aesthetic values and proper brightness ratios. The use of pastel colors is recommended and consideration should be given to having each wall a different color. Wood trim and venetian blinds may be of neutral color for standardization purposes if the selected color blends well with pastel colors.

Better Classroom Facilities

Fortunately, classrooms in most old buildings contain approximately 1,000 square feet of space. In some instances, cloak room partitions can be eliminated to make the classroom still larger. In any event, the larger the area for classroom purposes, the easier it is to provide for adequate instructional facilities. For purposes of description the instructional facilities of a classroom have been organized into five areas: the classroom library area; the science area; the arts and crafts area; the application area; and the teacher instructional area.

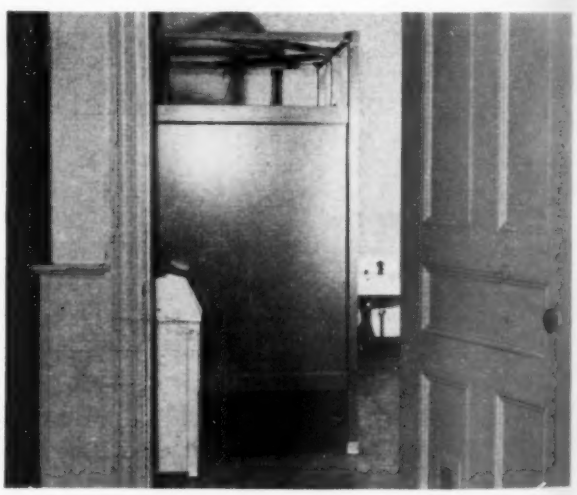


A corner of the corridor has been furnished with comfortable chairs and a tackboard for student displays.

The Classroom Library Area

Recent studies have indicated that over 600 books (basic, supplementary and library types) are needed for instructional purposes in an elementary school classroom containing thirty or fewer pupils. Although this number of books may not be immediately available, book shelving should be provided for future acquisitions. With the advent of movable furniture and less book storage area in desks and tables, space for these books and other materials must be found in the classroom.

The classroom library area, located in the brightest corner of the room, should contain sufficient shelving to house approximately 200 books and magazines of all sizes. The wall area directly above the shelving should consist of tackboard for picture displays. In conjunction with the library area two or three movable bookcases (waist high, with rubber casters and tack-



A small area of the Lenthal School in Newport, Rhode Island, has been changed into a toilet room.



Ample bookshelves have been provided in the modernized classrooms, and movable furniture also.

board in the rear) should be made available. The latter will help to form a library corner and, in a more important role, may contain source materials to be circulated to groups of pupils in other areas of the classroom.

Classroom Science Area

Plant and water life facilities should be available to pupils in the classroom. Not only an aquarium but facilities for propagating plants by seed, bulb, cutting and leaf should be available. Planting pans can be installed under windows as part of the cupboard space or can be made up into movable units. If developed as part of the cupboard space, the width should conform to the recommended 24-inch width of the counter.

Cupboard space may be provided near plant containers for the housing of science equipment such as magnifying glasses, microscopes, magnets, glass containers and tubing. The sink should be in this area but adjacent to the arts and crafts area as well.

For collections of rocks, minerals, leaves, feathers, shells, seeds and woods, a five-foot open bookcase is recommended. The bookcase may be used to house containers in which pupils may maintain and observe ant nests, different kinds of caterpillars, silkworms and other forms of insect life. Bulletin boards are recommended on all wall space available in this area.

Arts and Crafts Area

Since creative activities (which may be manifested through building, modeling, painting and handiwork) require so much storage space, waist high cupboards with a counter of approximately 26-inch width are strongly recommended. These can be located on the side of the classroom opposite the windows. The counter could have a pencil groove near the edge for placing 24-inch by 36-inch boards for easel work.

Ceramic materials should be located under the sink since cupboards are needed for storage of large paper and other arts and crafts materials. All available wall space above the counters again should be used for bulletin board space.

Movable units, waist high, with twelve-inch cupboards on one side and a bookcase on the other may be used by groups of pupils in any area of the classroom for arts and crafts activities. A kiln for use by all classrooms may be located in the basement area of the school.

Teacher Instructional Area

The teaching of skill subjects (reading, language and mathematics) is based entirely upon the rate of individual achievement. After proper analysis pupils are grouped according to strengths and weaknesses, and particularly in accordance with levels of achievement for instructional purposes. Consequently, the teacher instructional area must be designed for group instruction activities.

If possible one side of the room should be set aside for this purpose. The chalkboard need not exceed more than 40 square feet (4 feet by 8 feet by 10 feet) with the lower edge to be not more than

24 inches from the floor. Located under and at each side of the chalkboard should be shelving for source materials such as basal-books, workbooks and duplicated materials. Adjacent to the chalkboard may be located the teacher's desk and file.

Although all areas in a classroom are usually available for application purposes, there should be a specific application area where pupils may work independently, either individually or in groups. This area should contain pupil furniture rather than fixed classroom facilities, although additional book shelving should be located nearby whenever possible. Instructional source materials, maps and books should be available to groups of pupils without undue classroom disturbance.



An entrance to the Lenthal School has been improved with new brick facing and glass blocks.

Movable furniture, which tends to promote group work, should be purchased to replace the fixed school furniture found in so many old school buildings.

Classroom Appearance

The classroom in any school should be a school home for children. Mirrors used for posture work but located for decorative purposes can make an important contribution. Drapes of glass fibre or similar materials will eliminate sun glare but also help to create a homelike atmosphere. Murals, painted by the pupils, should be hung on the walls. Plants brought from the home or grown in various portions of the room tend to make a bare classroom more attractive.

Many such provisions can be made in a modernization program to make the classroom, as well as the entire school, another home for children.

Care of Roofs, Walls and Floors

Aside from the customary repair and maintenance of the roof, there are some changes in the roof itself which may greatly improve the appearance and enhance the life of an old school building. A shingled hip or gabled roof which needs considerable repair may be replaced with a flat roof and 20-year bonded composition roofing if structural conditions warrant. Parapet walls, frequently the cause of leaking roofs, may be removed and the roof finished off with a gravel stop.

To improve the appearance of the building the outside walls may be cleaned, sandblasted or painted. Masonry walls which leak even after pointing may be treated with transparent silicone waterproofing.

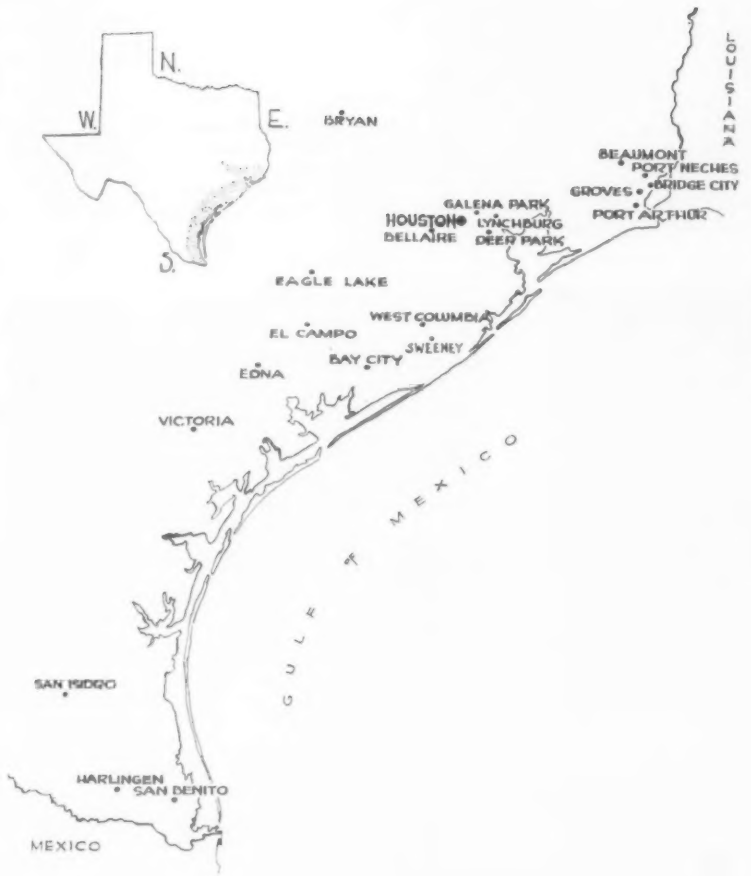
Wood floors, if not badly worn, may be cleaned and sealed. Uneven floors may be leveled with a cushion underlay such as magnesite and then finished with asphalt tile or linoleum. Both of these finishes require considerable wax maintenance. It is hoped that some of the new plastic tiles which do not require waxing will prove a boon to maintenance schedules.

All floor finishes should be light in color with a light reflectance of 25–30 percent. The quality and evenness of illumination will be greatly improved.

Costs and Conclusions

The costs of school modernization, as recommended herein, will range from 10 percent to not more than 20 percent of the replacement value of the school building. If renovations such as replacing stairwells are not necessary, the modernization program may be less than 10 percent of replacement value.

Pupils are entitled to live in a school building which is sanitary and safe and which contains adequate facilities for instructional purposes. Old school buildings, contemplated for use during the next fifteen-year period, should contain those facilities and conditions found in newly constructed buildings. Every school system should have under consideration a planned program of school modernization and a planned effort at realization of that program giving it the same emphasis now applied to the construction of new schools.



The 29 Texas Gulf Coast elementary schools featured on the following pages are located in the cities indicated on this map. Inset shows the relation of the Gulf Coast to the whole of the state of Texas.

NEW ELEMENTARY SCHOOLS ALONG THE TEXAS GULF COAST



by HARRY D. PAYNE

The Office of Harry D. Payne, Architect and Engineer, Houston, Texas

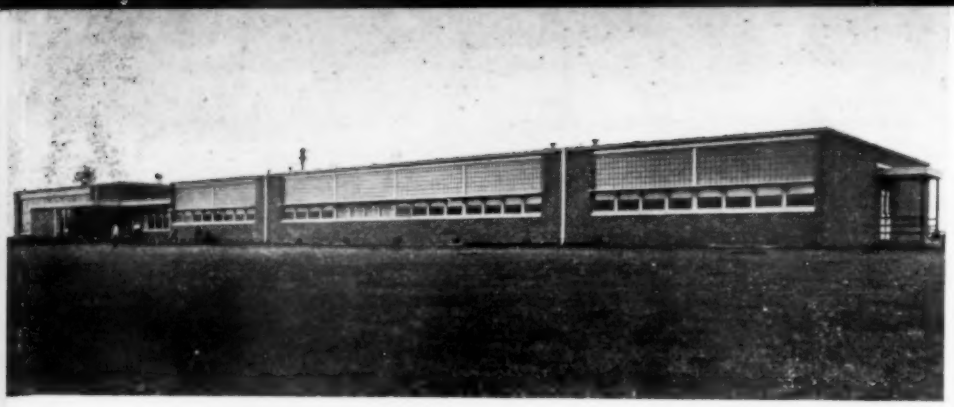
Harry D. Payne received his Bachelor of Architecture degree from Washington University, and pursued subsequent study at that University, at the University of Texas and at schools in France. He served in World War I as a first lieutenant with the Army and received a battle field promotion to captain. Following his war service and until 1925 Mr. Payne was an associate of Wm. B. Ittner. In 1925 the Houston Independent School District engaged him as consulting architect for its elementary school building program. His independent practice, initiated in Houston in 1928, has embraced the design of more than 150 schools, and has included consulting services for school programs in five communities; all of these along the Texas Gulf Coast. His professional memberships include: American Institute of Architects, Texas Society of Architects and American Society of Civil Engineers.

HAVING observed and participated in the advancement of school design along the Texas coastal plain since 1919, the compiler of this picture story has developed a very personal, as well as a very keen professional, realization of the particular characteristics and problems inherent in school design along the extended sweep of the Gulf Coast.

How are the educators and architects of Texas solving the problems of educational practices, a diversity of peoples and climatic conditions at once common to the entire area but also varying from the temperate areas near the northern border with Louisiana to the near tropic climate of the southern border?

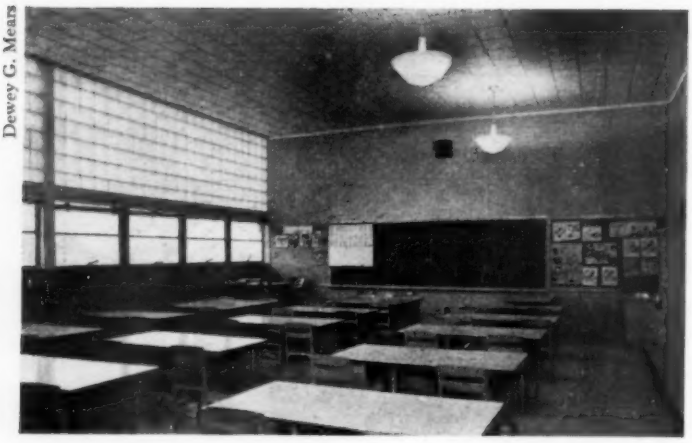
A Look at 29 Schools

A look at 29 of the new elementary schools along the Texas Gulf Coast reveals what 19 of the area's architectural firms have accomplished so far in their efforts to provide schools which meet the needs of the coastal region.



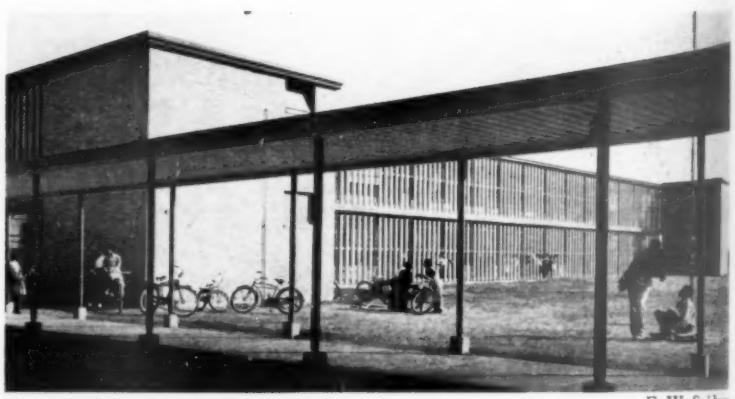
Eagle Lake, Texas, Elementary School has glass block window walls with vision strips below. At lower left is a view of a classroom interior. Architects of the building are Page, Southerland and Page, Austin.

Dewey G. Mears





Entranceway to the Eagle Lake School.



F. W. Seiders

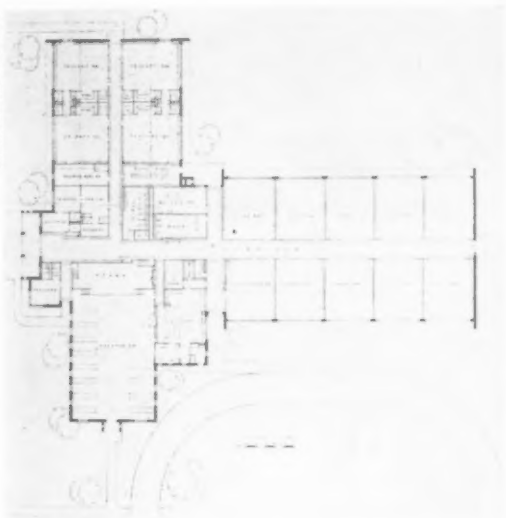
Outdoor connecting corridor and bicycle area of the El Campo, Texas, Elementary School designed by O'Neil Ford.



Indoor corridor of the El Campo School is partially exposed to the out-of-doors by means of a wall of widely spaced vertical strips. O'Neil Ford of San Antonio is the architect.



Entrance to the primary section of the Groves, Texas, Elementary School is gaily decorated with nursery rhyme figures. Herbert Voelcker and Associates, Houston, are the architects of the school.



Edward A. Bourdon



Home Owned Estates Elementary School, Galena Park, contains 14 classrooms and a cafetorium. Herbert Voelcker and Associates are the architects.

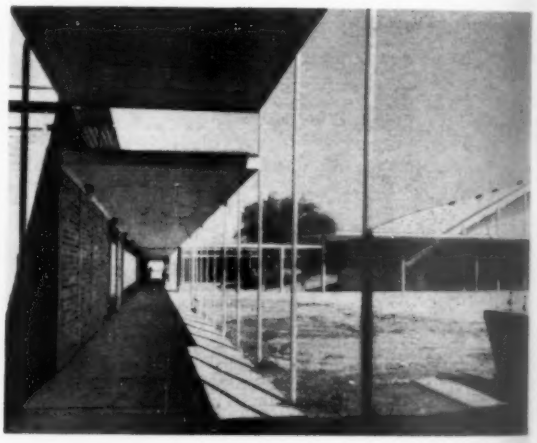


Thomas Jefferson Elementary School, located in the Houston Independent School District, contains 21 classrooms, 1 kindergarten and a cafetorium. Herbert Voelcker and Associates, architects.



Purnell



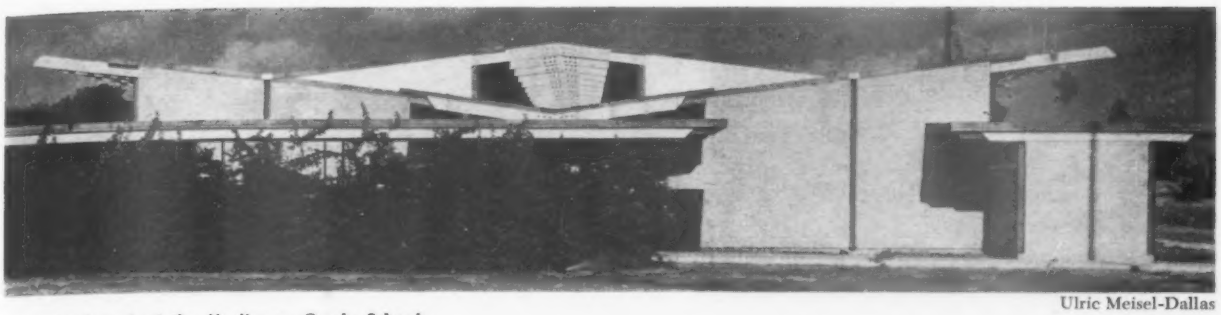


Three views of the San Isidro, Texas, School. Aerial view is at left. Below, left, is an exterior of the auditorium and the bus loading section of the school. Below is the walkway which leads from the shop to the high school section. Cocke, Bowman and York, Harlingen, are the architects of the school.



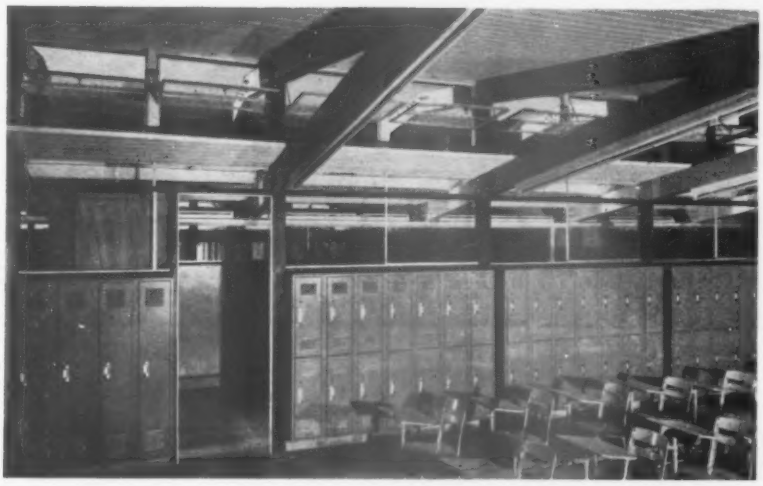
Ulric Meisel-Dallas

Central corridor with skylights and a continuous light trough of the Harlingen Grade School, Harlingen, Texas. Sliding glass panels are located above the classroom lockers. Cocke, Bowman and York, architects.

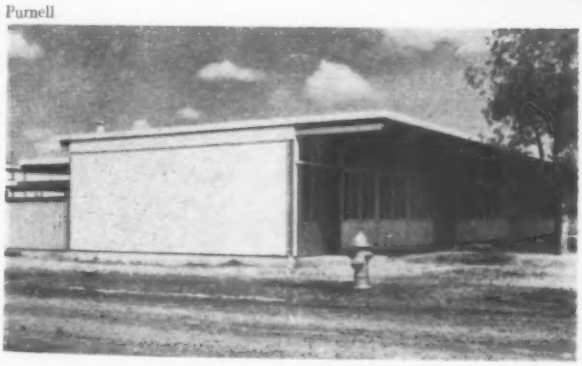


Ulric Meisel-Dallas

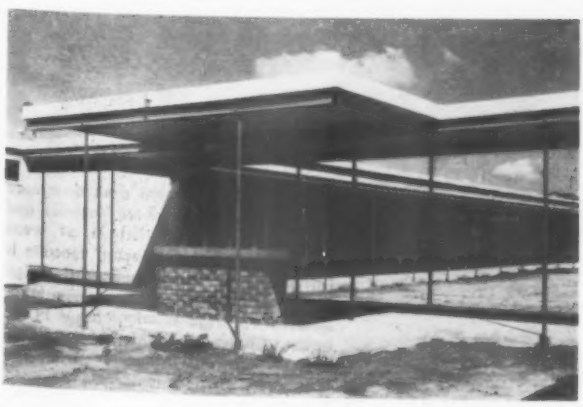
Sawtoothed roof of the Harlingen Grade School allows bilateral lighting by means of a center corridor. Flat-roofed areas contain workrooms and individual toilets. At right is a classroom interior, with the corridor clerestory shown. Steel windows provide high ventilation. Cocke, Bowman and York, architects.



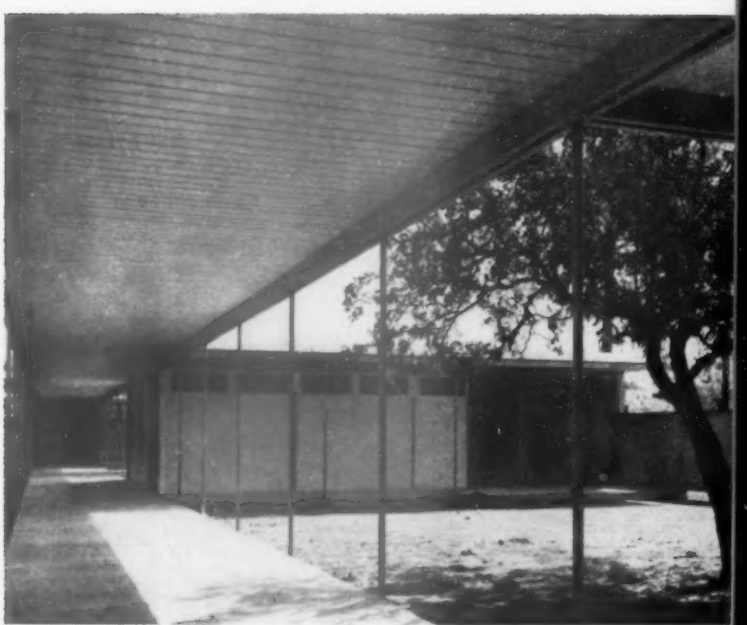
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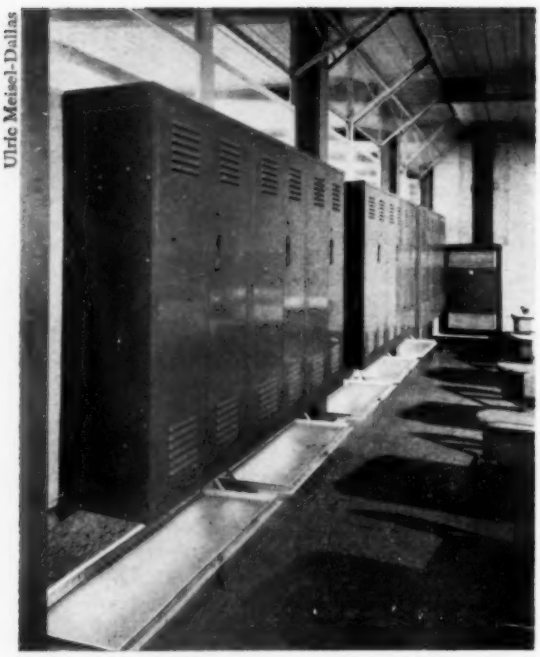


Exterior of the Frank Roberts School, San Benito, showing the north fenestration, above, and the wood beam overhangs. Below is shown the canopy over the drinking fountain, with a typical classroom wing in the background.



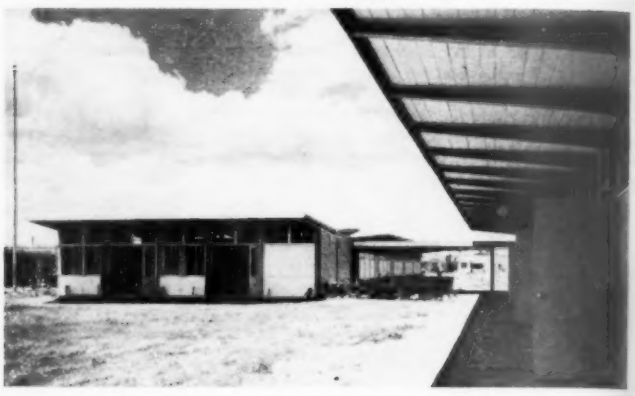
Frank Roberts School, San Benito, has pipe columns, wood beams and wood deck construction. Filler walls are pumite block. Cocke, Bowman and York are the architects.





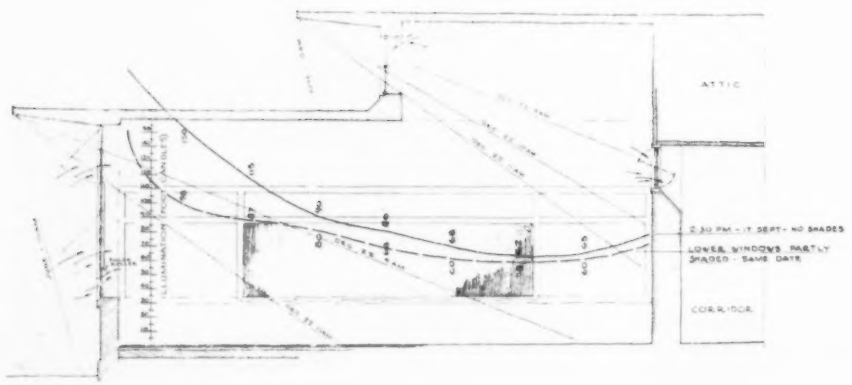
Ulric Meisel-Dallas

Lockers in classrooms of the Ed Downs School, San Benito, are suspended on concrete panels. Below is a view looking down one classroom unit to the free-standing shelter over the play area, which forms a link between the administration unit and the two classroom units. Cocke, Bowman and York, architects.





Woodcrest Elementary School, located in the Port Neches Independent School District. The building contains 12 classrooms, a kindergarten and a cafetorium. There are a total of 19,400 square feet within the structure and its capacity is 390 students. Herbert Voelcker and Associates of Houston are the architects.



This clerestory design was developed and is used by Herbert Voelcker and Associates. Construction is of wood or concrete, but reinforced concrete is proving most popular. Special design of the concrete beam permits introduction of large window areas in the beam, giving daylight unilaterally at both lower and upper levels. In this way the classroom is uniformly lighted throughout.



Front entrance of the L. T. Cunningham Elementary School, Bellaire. Goleman and Rolfe of Houston are the architects of the building.

F. Wilbur Seiders



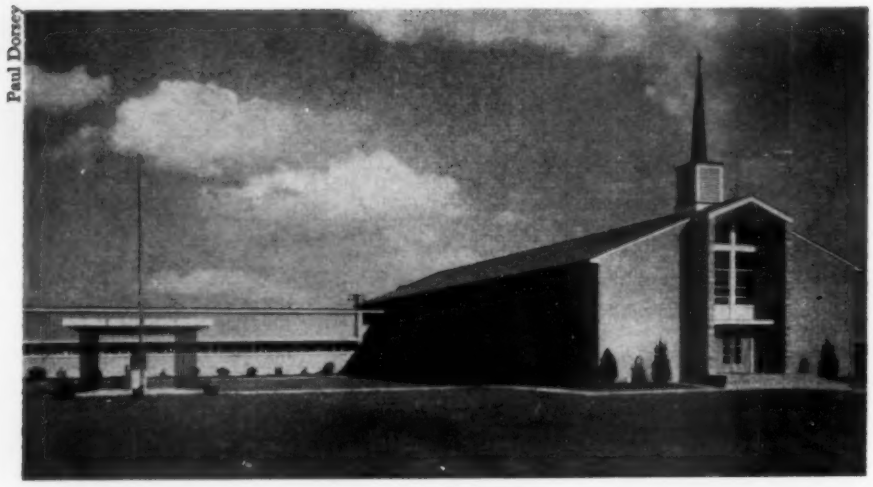
Open passages of the L. T. Cunningham Elementary School.



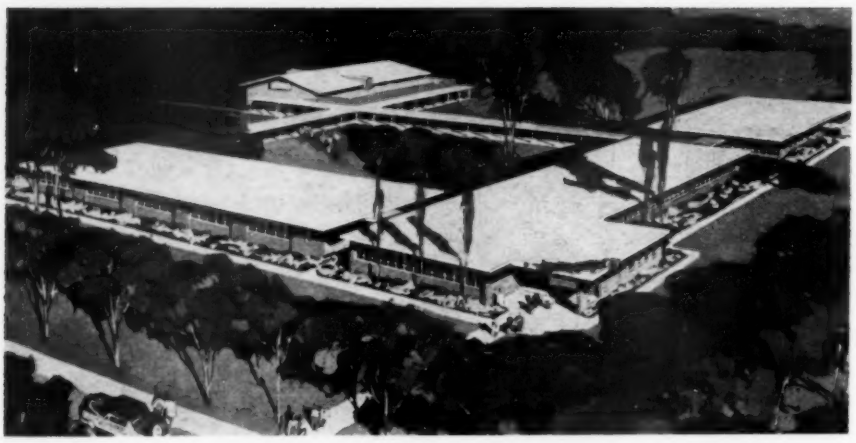
Classrooms of the L. T. Cunningham Elementary School have cross ventilation. Rear wall contains many storage units.



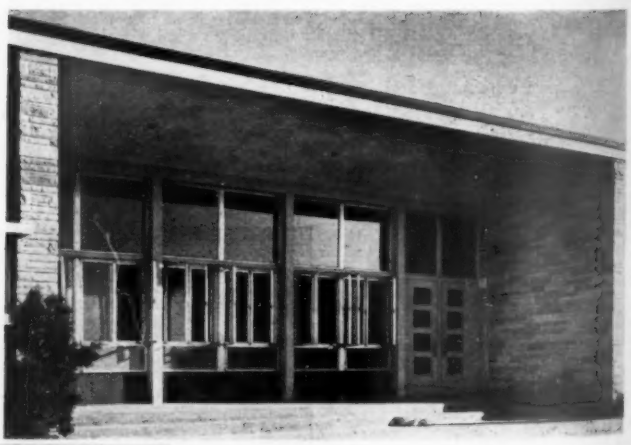
Combination auditorium-cafeteria of the L. T. Cunningham School. Low budget necessitated laminated wood construction. Goleman and Rolfe, architects.



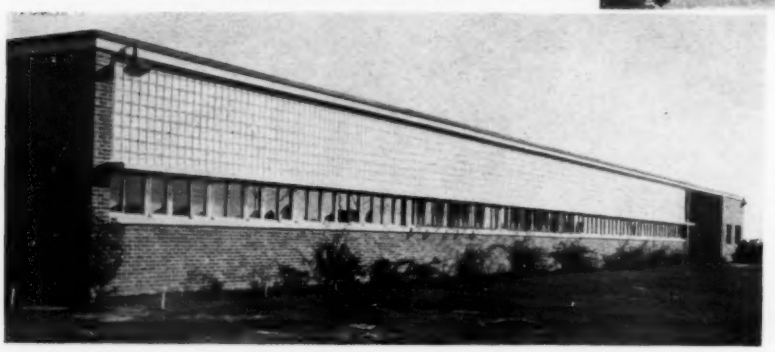
Holy Cross School, Bay City, is a unit in a country town parish group which includes the six classroom school, a church rectory and a convent. Golemon and Rolfe, Houston, are the architects.



Master plan project for the James Bowie School, Beaumont, includes a gymnasium, classroom units and a shop area. All elements are now completed. Golemon and Rolfe, architects.

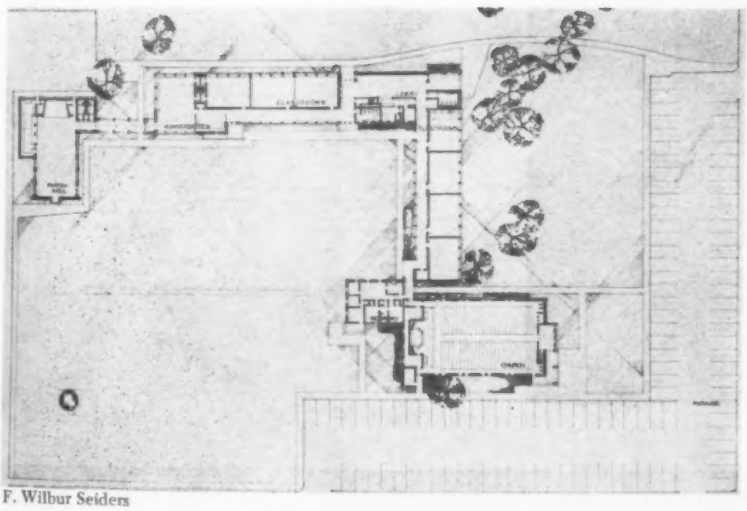


Bridge City School, Bridge City, Texas, is a small country school with eight classrooms, library and administrative offices. The large-scale plan provides for expansion of elementary facilities as well as a future high school. Golemon and Rolfe, architects.





Paul Dorsey



F. Wilbur Seiders

Gymnasium of the St. Theresa School, Houston, shown above, is being used as a temporary church. Unit cost of the gymnasium was low by use of exposed interior materials and a steel bent frame. First floor and site plan, at left, show elements within the master plan. One of the primary rooms, below, has areas for formal teaching and informal instruction. Golemon and Rolfe, architects.

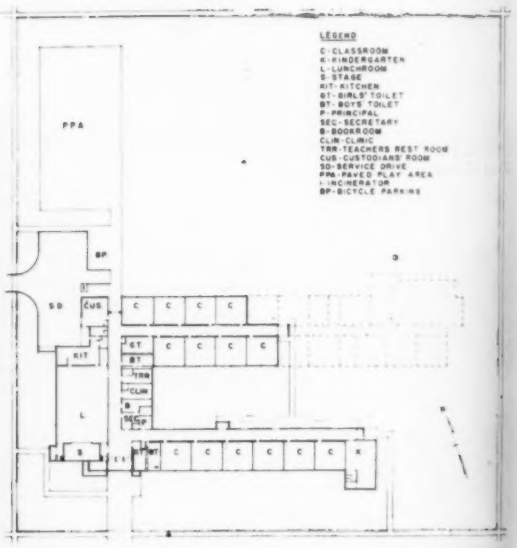


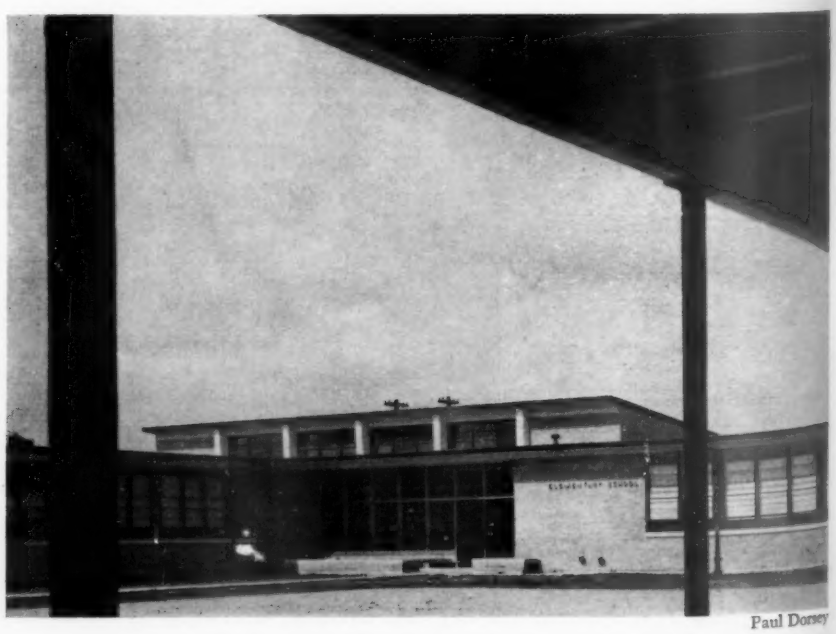


M. E. Foster Elementary School, Houston, has a favorable exposure to the prevailing south breeze. Stayton Nunn is the coordinating architect; Vance D. Phenix, project architect. Floor plan of the school is below.

High windows of the M. E. Foster Elementary School have unshaded glass blocks above and inside-shaded clear windows below.







Kashmere Gardens Elementary School, Houston, features shelves in windows of the entranceway for displays of all kinds. Stayton Nunn is the coordinating architect of the school; Lloyd and Morgan, project architects.

Paul Dorney



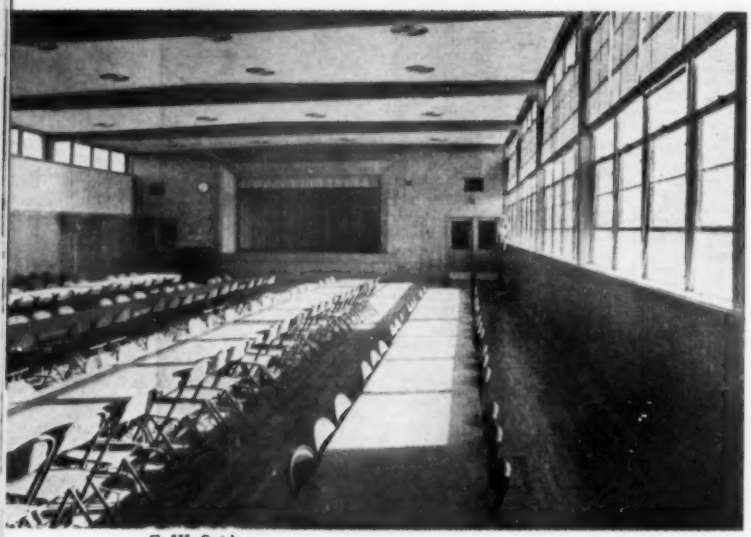
Lunchroom of the J. C. Sanderson Elementary School, Houston, serves also as a play room and as an auditorium. Cafeteria counter is in the kitchen, and doors and pass windows are only opened during lunch periods. Stayton Nunn, coordinating architect, Thomas E. Greacen II, project architect.



Porch-passage roof of the J. C. Sanderson School overhangs eleven feet in order to shade the relatively tall south windows.



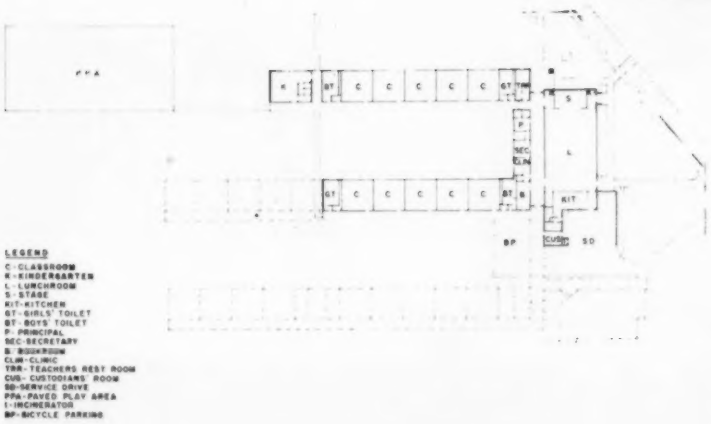
In classrooms of the J. C. Sanderson Elementary School, height from floor to level ceiling is eleven feet, six inches.



F. W. Seiders

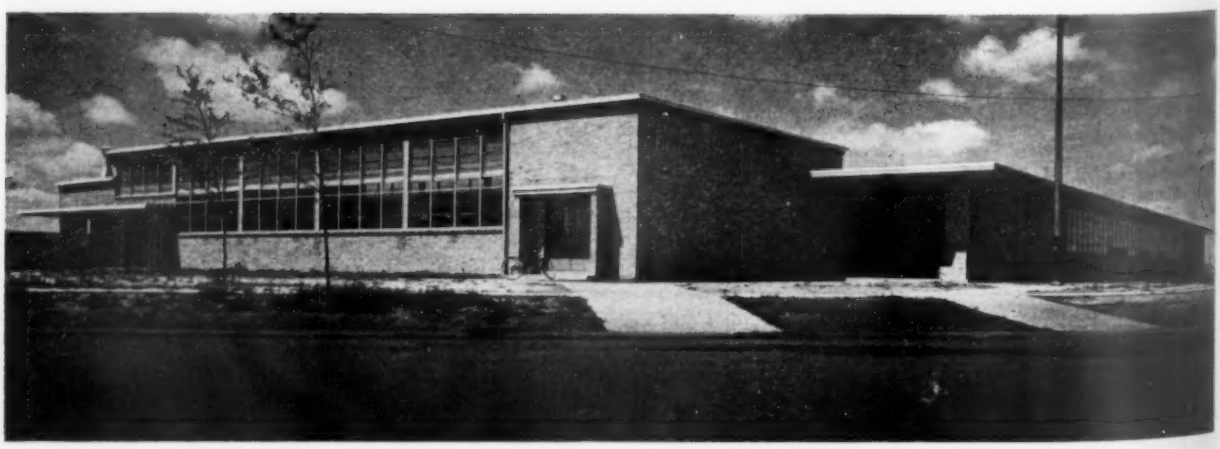
Multi-purpose room of the Mamie Sue Bastian Elementary School, Houston. Stage and adjoining vestibules are at rear. Vestibules separate the outswinging doors on the lunchroom side from the direct exit doors. Exposed ceiling beams are of glued, laminated wood. The classroom, below, has a sloping ceiling which measures in height from 8 feet, 10 inches, to 10 feet, 7 inches. Stayton Nunn, coordinating architect; Wilson, Morris and Crain, project architects.

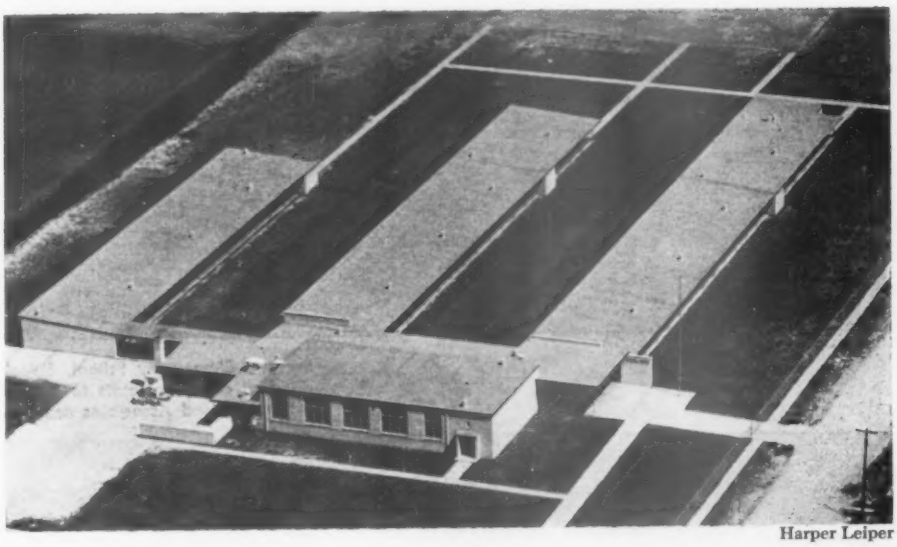




LEGEND
C - CLASSROOM
K - KINDERGARTEN
L - LUNCHROOM
S - STAGE
KIT - KITCHEN
GT - GIRLS' TOILET
BT - BOYS' TOILET
P - PRINCIPAL
SEC - SECRETARY
R - ROOM FOR
CLIN - CLINIC
TRR - TEACHERS REST ROOM
CUS - CUSTODIANS' ROOM
SD - SERVICE DRIVE
PPA - PAVED PLAY AREA
I - INCINERATOR
BP - BICYCLE PARKING

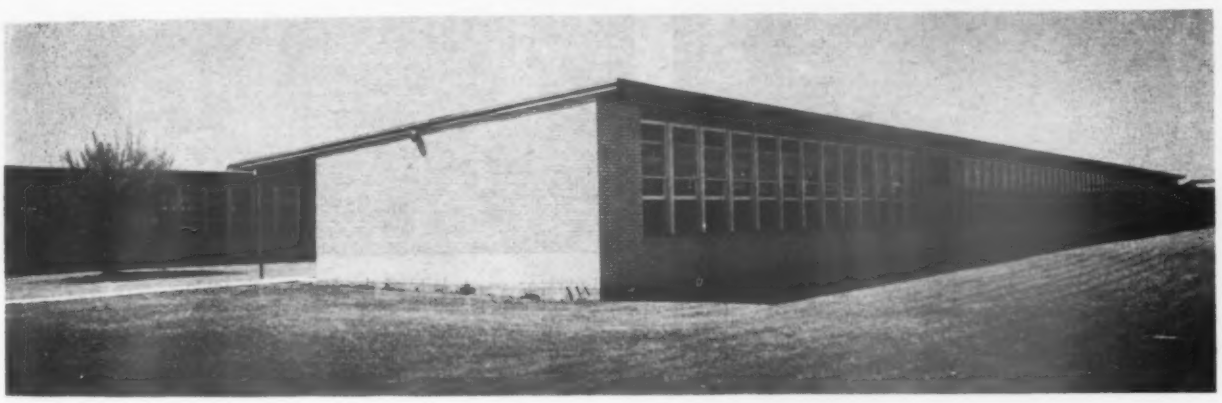
Floor plan, left, of the Mamie Sue Bastian Elementary School, with future expansion areas shown. The low ceiling height of the rooms and the roof projection on the north reduces glare within the building to a comfortable level without the use of shades, blinds or similar mechanisms.





Houston Gardens Elementary School, Houston, has one-room deep classroom wings which extend from the central stem corridor. The wings have porch-passages on the south which serve for circulation and light control.

Harper Leiper



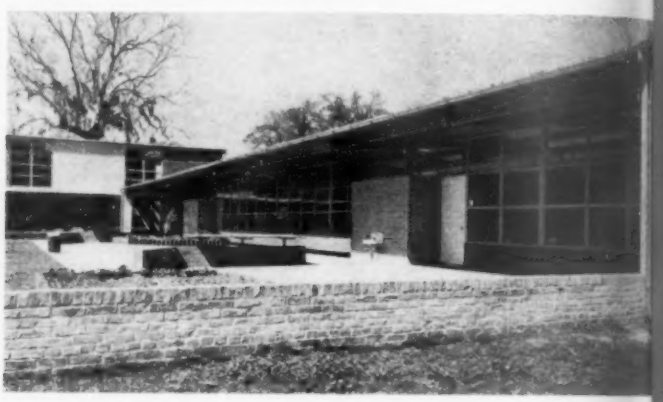
Roofs of the classroom wings of the Houston Gardens Elementary School slope downward. Within the classrooms, right, the sloping ceiling frees pupils from objectionable glare from the sun, while the teacher need not bother with adjusting shades or blinds. Stayton Nunn, coordinating architect; Hamilton Brown, project architect.



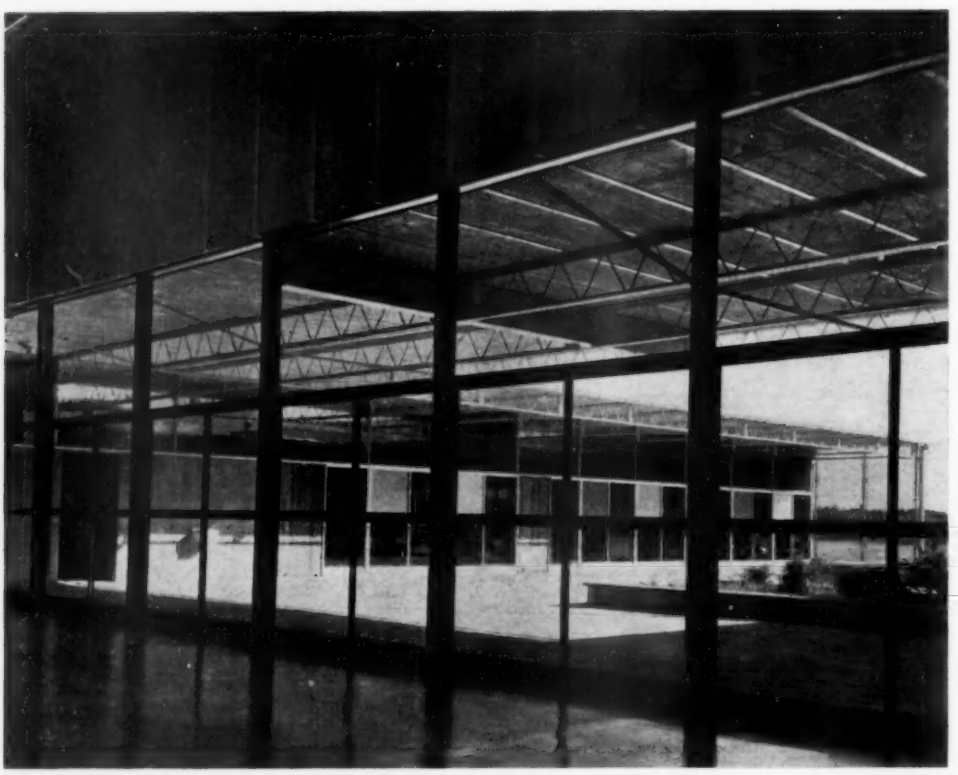


Sweeny Elementary School, Sweeny, Texas, has individual classroom exits to the out-of-doors. Donald Barthelme and Associates are the architects.





Multi-purpose room, left, of the Sweeny Elementary School, and outdoor paved play areas, shown above.



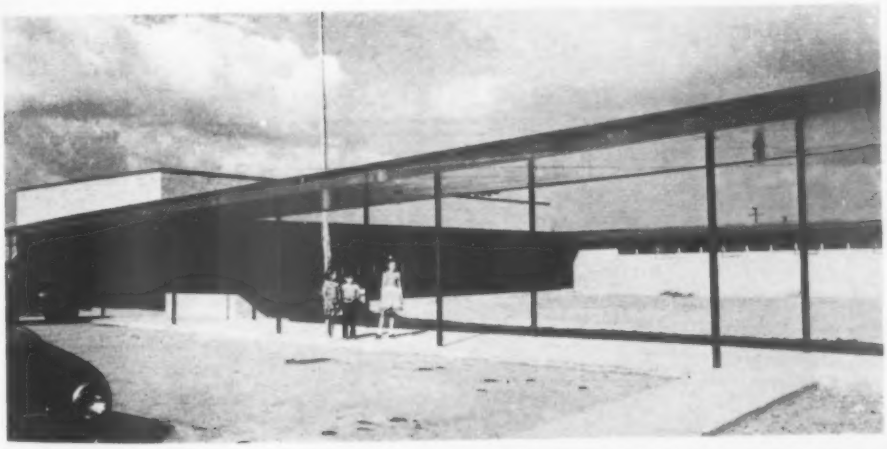
Outdoor area of the West Columbia Elementary School, West Columbia, is directly accessible from the classrooms. Donald Barthelme and Associates, Houston, architects.



Business Men's Studio

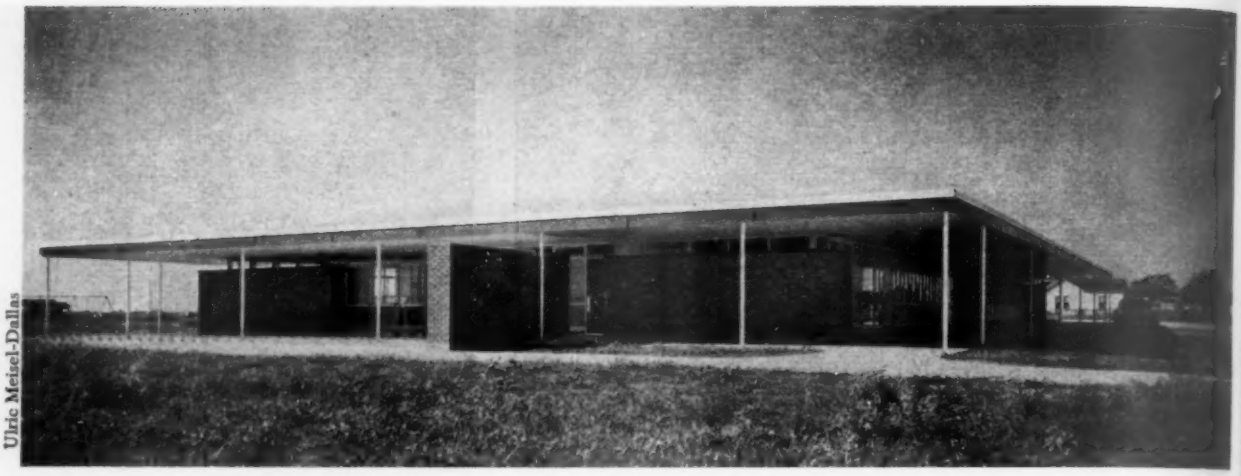


Lobby and drinking fountain area, above, of the Averill School, Beaumont, Texas. At right is the school entrance which leads from the bus unloading area. Stone and Pitts, Beaumont, are the architects-engineers.



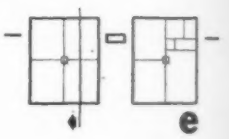
Bus loading platform and main entrance court of the Shields Elementary School, Victoria, Texas. Cafetorium is to the left. The walk from the loading platform connects at right to the special classroom for handicapped children. All classrooms have directional glass block on the northern exposure which, with the sloped ceiling, gives excellent natural light distribution. Architect of the Shields School is Arne G. Engberg of Houston.

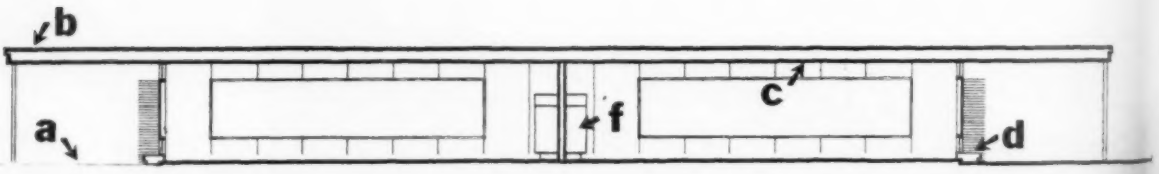


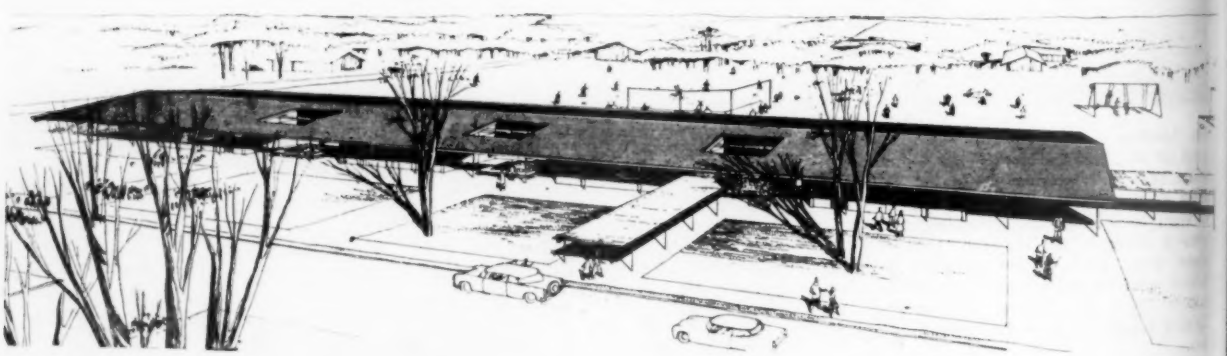


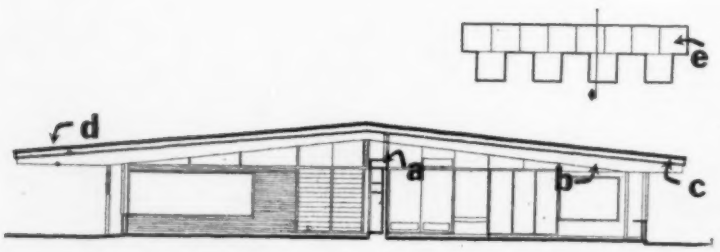
Ulric Meisel-Dallas

Phillis Wheatley Elementary School, Port Arthur, Texas, has a pressure wall, shown perpendicular to the exterior wall, to facilitate natural ventilation. The umbrella roof doubles as sun control and rain shelter. In the cross-section plan below areas indicated are: a. covered activity area and corridor; b. overhang for sun and rain protection; c. low ceiling; d. concrete seat; e. quadruplex plan with ventilation baffles. Architects are Caudill, Rowlett, Scott, Neff and Associates, Bryan and Port Arthur, Texas.

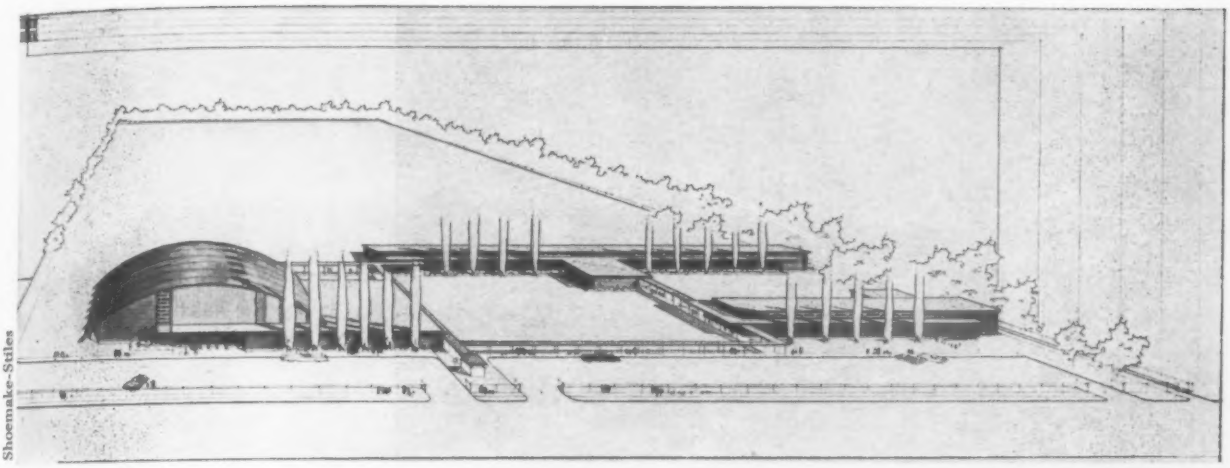








New Austin Elementary School, Edna, Texas. Only a covered walk (extreme right) connects to the existing building. Note the openings in the roof over the garden courts. Key to the cross-section plan at left is as follows: a. integrated heating duct; b. laminated wood beams; c. 4-inch wood deck spanning 14 feet; d. outdoor corridor and sun control; e. triad grouping of classroom units. Architects are Caudill, Rowlett, Scott and Associates, Bryan, Texas.

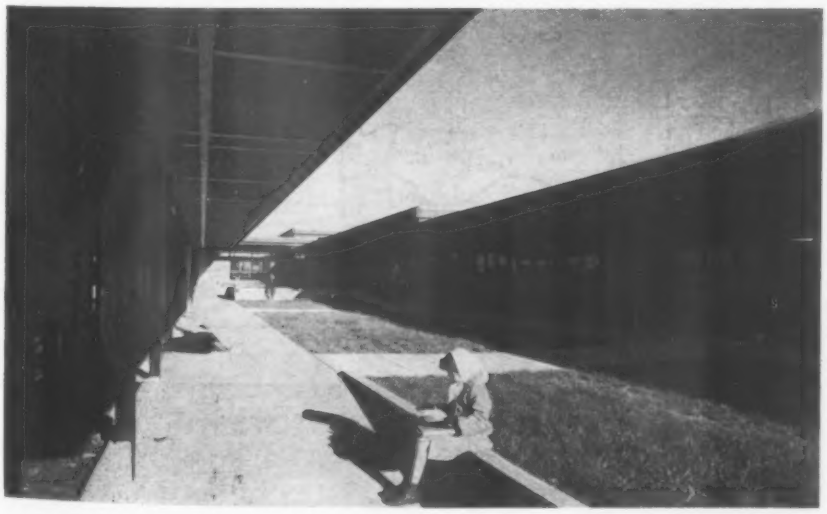


Shoemake-Stiles

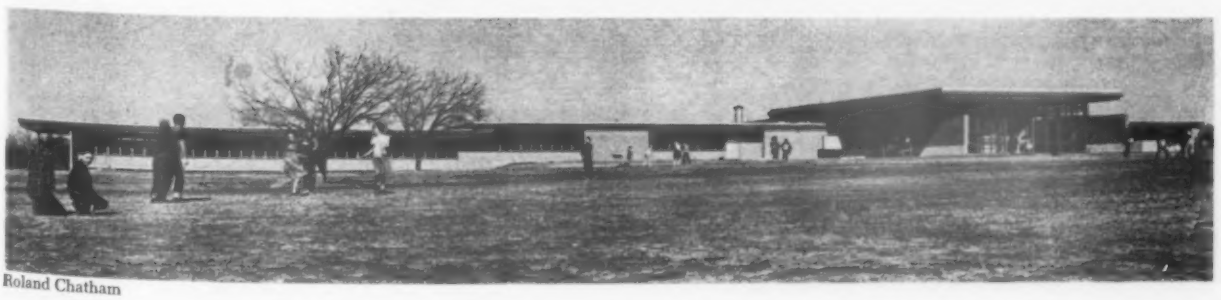
South campus of the St. John's School, Houston. Exterior materials are natural redwood and corrugated asbestos. The curved roof of the gymnasium has built-in plastic skylights that give a daylight quality to interior lighting. At right is a classroom interior of the school. MacKie and Kamrath, Houston, are the architects.



F. Wilbur Seiders



Out-of-door teaching facilities for students of the Ben Milam Elementary School, Bryan, Texas, are prevented by the Texas "Northers" common to the region. By orientating the length of classroom wings perpendicular to prevailing breezes a sheltered area has been created. Here children may play outdoors even in bad weather. William E. Nash of Bryan, architect; Stone and Pitts of Beaumont, associated architects and engineers.

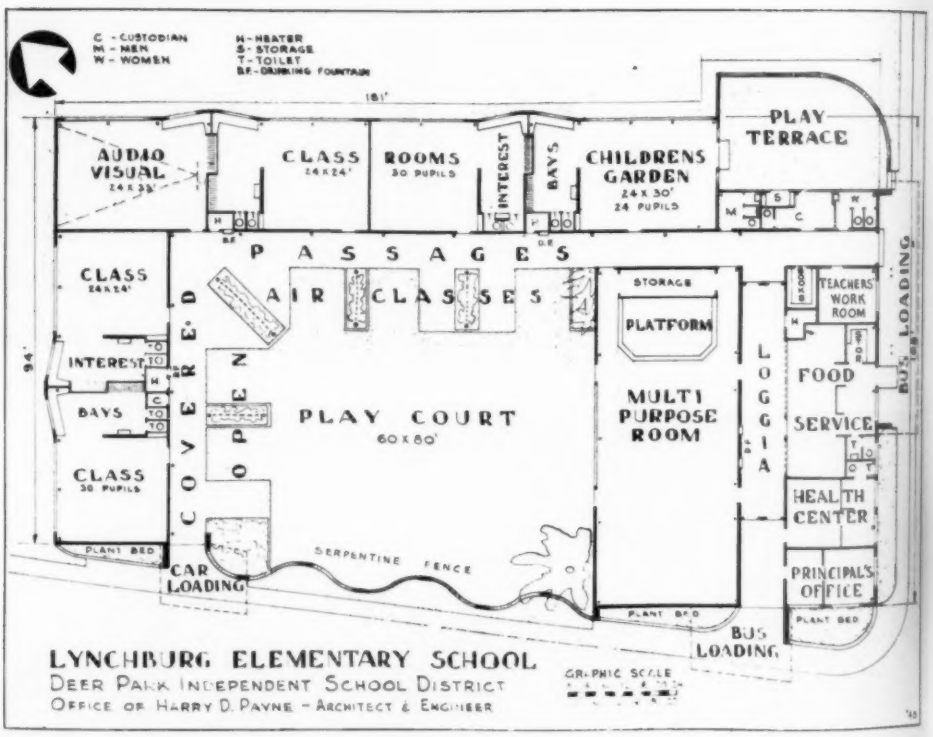


Roland Chatham

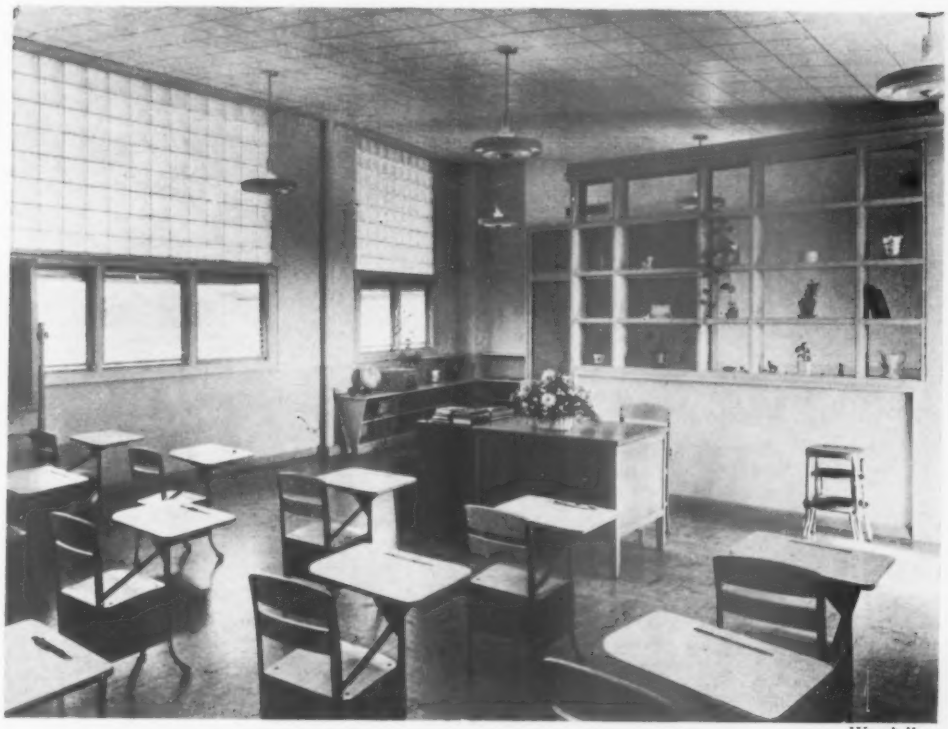


Stardes

Lynchburg Elementary School, Deer Park Independent School District. Above is shown the covered passage at the entrance to the classroom wing. In view below the multi-purpose room is at the right. A serpentine fence encloses the play court and forms a connecting link between the multi-purpose unit and the administrative-service wing and the classroom unit. These areas are defined in the floor plan at right. Architect of the building is Harry D. Payne, Houston.







Within each classroom of the Lynchburg Elementary School is a screened partition which separates the main area from its individual interest bay. The screen also encloses the wardrobe, wash-up and toilet areas. Vision strip below the directional glass block is glazed with panels of ventilating louvers which may be tilted to direct and control natural air currents. Harry D. Payne, architect.

Woodallen



The oversize kindergarten has its own enclosed play terrace. Access is through a swing-up door which also serves to shade the opening from the southeast sun. When closed, see right of illustration, the inside surface of the door provides a large tackboard panel. As elsewhere throughout the Lynchburg School, all doors other than the swing-up door are 6 feet, 4 inches high.



Close-up view of the interest bay and screen of a Lynchburg School classroom. Wash-up facilities and doors to the toilets are in the background.

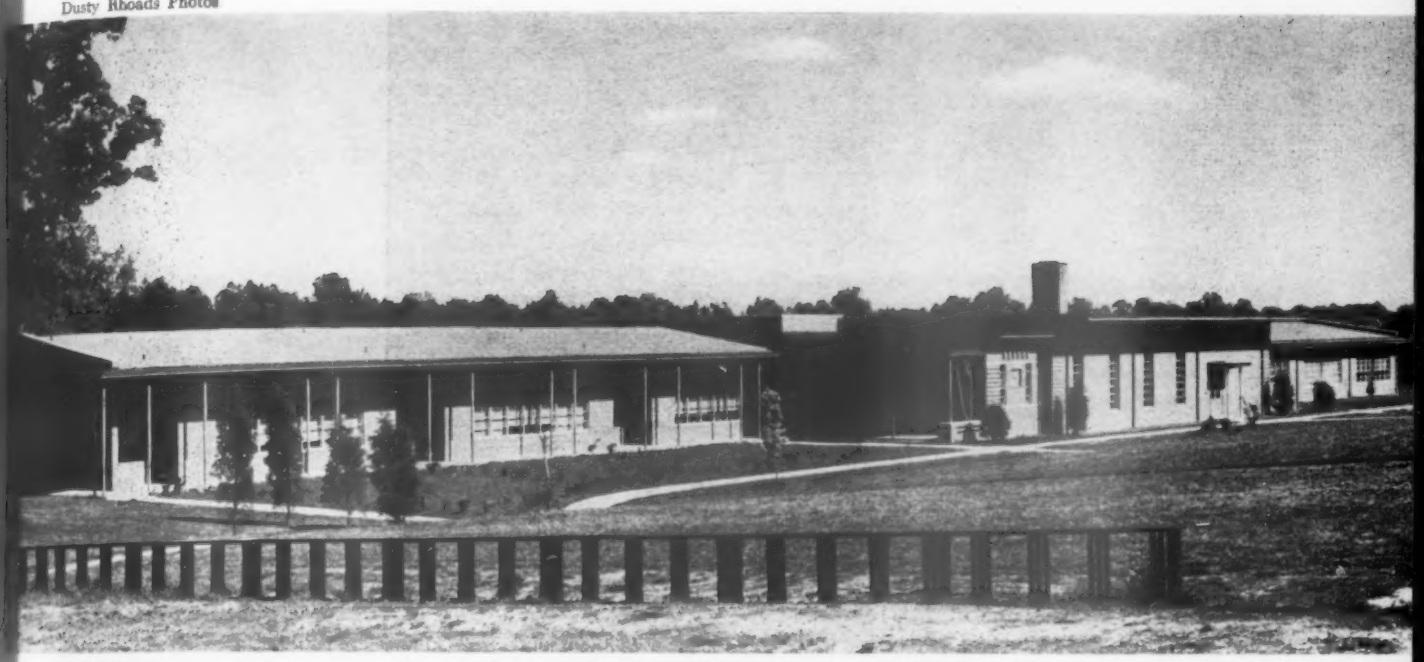


Multi-purpose room of the Lynchburg Elementary School, Deer Park, Texas, is used for a lunchroom when tables and benches are lowered from their wall storage niches.



Food service counter and soiled dish disposal counter are ready for use when their wall doors are swung open. This service loggia opens directly into the multi-purpose room main area. Harry D. Payne is architect of the building.

Dusty Rhoads Photos



Park Road Elementary School, Charlotte, North Carolina. The architect is Charles W. Connelly. Primary wing has private outside entrances with sheltered vestibules.

FIVE NEW ELEMENTARY SCHOOLS IN CHARLOTTE, NORTH CAROLINA



by ELMER H. GARINGER

Superintendent, Charlotte City Schools, Charlotte, North Carolina

Dr. Garinger obtained his bachelor's degree at the University of Missouri and his M.A. and Ph.D. at Teachers College, Columbia University. He began his educational career in Missouri and came to Charlotte, North Carolina, as high school principal in 1921. He later became associate superintendent and then superintendent. Dr. Garinger has taught summer courses in educational administration at the Universities of Missouri and North Carolina, at Clark University and at Peabody College.

LIKE other growing cities, Charlotte, North Carolina, has felt the necessity for expanding its school facilities to meet the needs of a rapidly mounting school population. Since 1946 when the first bond issue for capital improvements was made, two other local bond issues have followed, plus a third on a statewide basis. In this seven-year period seven new elementary schools have been completed and occupied; five others are in various stages of development and will be ready for the 1954–55 school term. In addition to these complete projects major additions or modernization jobs have been carried out for fourteen other existing elementary schools. These new schools, or adaptations of old schools, represent a departure from the traditional school plant of other years.

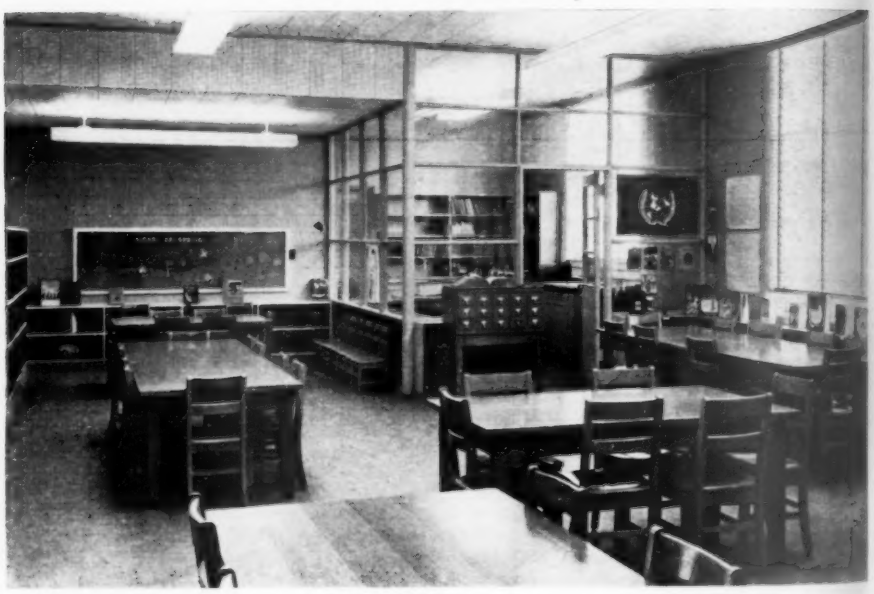
The Board of Education seldom considers a site of less than ten acres as suitable for an elementary school. Few of the new schools of Charlotte will have sites of as little as ten acres; most of them now have twelve to fifteen acres; and a few have as many as twenty-four acres.

Five Schools to Consider

We are presenting here five of these schools. Each represents a point of view or a design that seems to have merit in the effort to find the best solution for



Auditorium of the Park Road Elementary School. The steps shown lead up to the corridor.



Park Road School library. Librarian's work room is separated from the main reading room by a glass partition. An end alcove is especially reserved for small children.

that particular community in its school building needs.

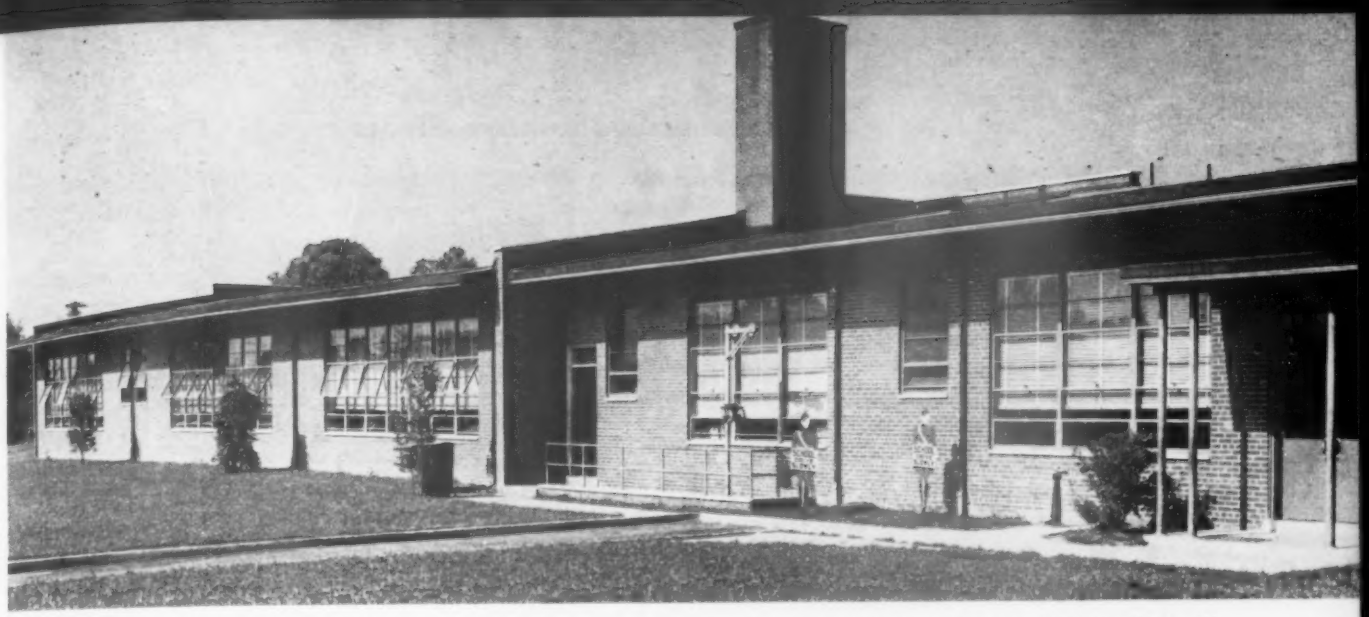
Park Road School

Park Road Elementary School was the second school to be built in the recent building program. Naturally, it does not break with the past as completely as do the schools designed since then. The architect, Mr. Charles W. Connelly, and the educational consultants, Engelhardt, Engelhardt and Leggett, as well as the school officials have been pleased with the school from the very beginning.

Two years have now passed since the school opened its doors to its first pupils. In these days of change and constant striving for improvement in every phase of architecture, two years is not too short a period to look back and make a re-evaluation of this school.

General Appearance

Taking first into consideration the general appearance of the building, it is apparent that its quiet residential air blends with its surroundings very well. The low pitched roof with its wide overhangs and the covered walkways avoid the factory appearance that many contemporary schools have. The focal point of the school is the main entrance with the mass of auditorium rising just to the right. This entrance, auditorium, and administrative area hold together the two classroom wings, the primary wing on the left with six classrooms and the grammar grade wing on the



Elementary wing of the Park Road School in Charlotte, Charles W. Connelly, architect. The low pitched roof has wide overhangs.

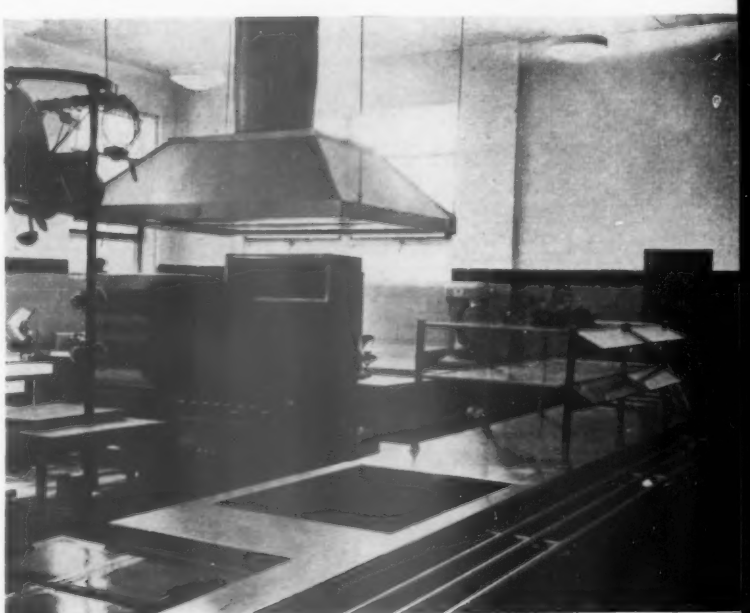


Lunchroom at the Park Road School. The low windows enable children to see out as they sit at lunch. The kitchen, shown below, contains provisions to serve a complete and balanced lunch. The service counter placed in the kitchen permits the dining room to be separated entirely from the noise and odors of food preparation and the dishwashing area.

right with six classrooms. Striking off towards the rear from this central portion is the wing containing the library, visual aids room, the community room and the cafeteria.

Color on the exterior is used to accent doorways and windows. All exterior doors are painted a gay red, while the window sashes are of sea-foam green. All exposed structural steel, such as pipe column members supporting the roof over the covered walks, is likewise painted sea-foam green. These colors and the overall tone of the red brick give the school a very appealing atmosphere.

Upon entering the building one is conscious of the ease of circulation. The three wings mentioned previously radiate from the entrance area in the form of an offset "tee." The double-loaded corridors are top lighted by the use of light panels in the ceiling. These light panels are set in the roof of the dropped area between the pitched roofs of the classrooms on either side. Rising



up from this middle area the corridor becomes a clerestory on either side, providing bilateral lighting for all classrooms.

Primary Project Area

In a typical primary classroom the division of teaching area and project area is apparent. The project area is separated visually from the classroom proper by the use of a wood-framed glass screen. This project area has toilets for both boys and girls opening from it. There is an abundance of cabinets, both wall-hung and base, and a work sink. The classroom proper is 24 feet by 35 feet and amply supplied with book shelves, paper storage spaces, built-in seats, chalkboards, corkboards and wardrobes. These wardrobes have overhead sliding doors faced with cork. It should be added that each primary room has two entrances, one from the inside corridor and one opening to the outdoor covered walkway and outside teaching area, giving the primary pupil the privacy to which he is accustomed.

The 24 feet by 34 feet grammar grade classrooms are similar in plan and equipment except for the omission of the project area and the door to the exterior instruction area.

The auditorium seating 400 is placed not only for student use, but for gatherings by adults in the evenings. At the rear of the stage and on the same floor level is an all-purpose room that can be used in conjunction with activities on the stage. It has toilet facilities and double doors opening to the outside and to the stage so that furniture and groups of children can be moved on and off stage easily.

The cafeteria is probably the most attractive area in the school. Large windows lowered to 26 inches above the floor level bring in the out-of-doors, and the large grove of oaks adjacent to the cafeteria on the north side seem to be part of the room itself.

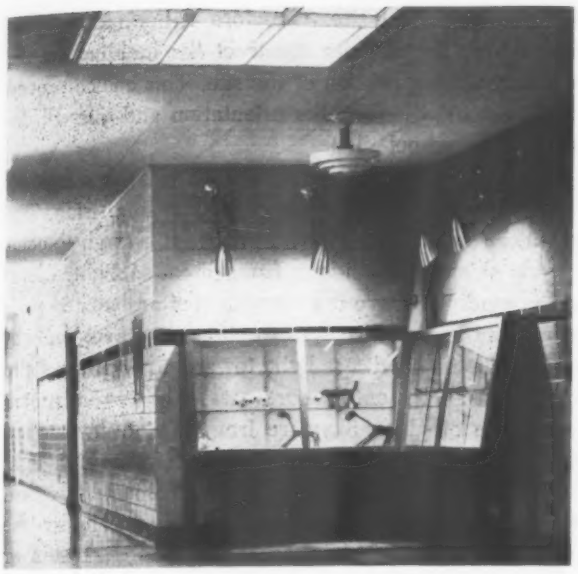
Adjoining the main entrance to the cafeteria are two hand washing rooms for students. The community room, opening from the cafeteria proper, has proved to be quite popular, serving many functions both during and after class hours. The use of color in the cafeteria is pronounced. The wall separating the cafeteria and kitchen is painted a warm brown, the other three walls a shade of yellow. Gaily figured window drapes made by the children, themselves, complement these colors.



Primary classroom in the Park Road School. Project room can be seen with doorway at left leading to the covered walkway and outside teaching area.

Structural Materials Used

Structurally, concrete block is used, exposed on the inside and faced with red brick on the exterior. Roof framing is of steel joists spaced 24 inches on center with a concrete roof slab, a built-up gravel roof being applied over this. The floors are concrete with asphalt tile in all rooms and terrazzo in the corridors. Terrazzo on the floors of the corridor and the glazed tile wainscot simplify the maintenance problem to a great extent. The ceilings are acoustical tile and plaster. Steel projected sashes are used throughout with fixed glass panels flanking the entrance doors.



Corridor of the Park Road School, showing lighted display cases for exhibits.

The natural bilateral lighting in all classrooms is aided by fluorescent lighting. The auditorium is lighted with recessed lamps and gooseneck spotlights grouped in front of the stage. Individual goosenecks are also used to illuminate the student exhibit case in the lobby. Classrooms are heated by radiant coils in the floor and radiant tubes in the ceiling adjoining all window areas.

Addition Is Rising

At present an eight classroom addition to the school is being built on the north side. This wing is offset towards the front of the existing building and is connected by a covered walkway. Generally, the new addition is similar in construction to the main building except for the following items. A lower pitched roof with the acoustical ceiling attached to the underside of roof joists is used instead of one suspended to a level ceiling line. A series of skylights has been substituted for the clerestory windows and the center light is eliminated. The corridor now borrows its natural light from the adjacent classrooms. A poured gypsum insulating roof is used instead of concrete with the roof joists spaced 48 inches on centers.

These changes were incorporated into the new structure not only for reasons of economy, but in the belief that they represent an improvement over the existing building. The original building cost $9.37 per square foot exclusive of all furniture and equipment.

Ashley Park Elementary School

By the time the building program had become a real effort on the part of all concerned to design an elementary school plant that would be a functional unit to serve the needs of a "most favored school organization," the Board of Education and school officials were ready to experiment with less conventional plans. Open corridors, larger rooms, more storage cabinets, more tackboards, more natural light became objectives of real concern. The Ashley Park School is a good example of the results of such creative activity. The architect, Mr. D. M. Mackintosh, achieved a genuine improvement in elementary school design.

Areas Within the School

Sketches were developed for an 18-classroom school with an administrative unit, a small auditorium, a cafeteria, kitchen and boiler room. Two wings of six

Ashley Park Elementary School, D. M. Mackintosh, architect. Prefabricated concrete panels are used on the outside of the covered walkway. Open spaces may be filled with windows.



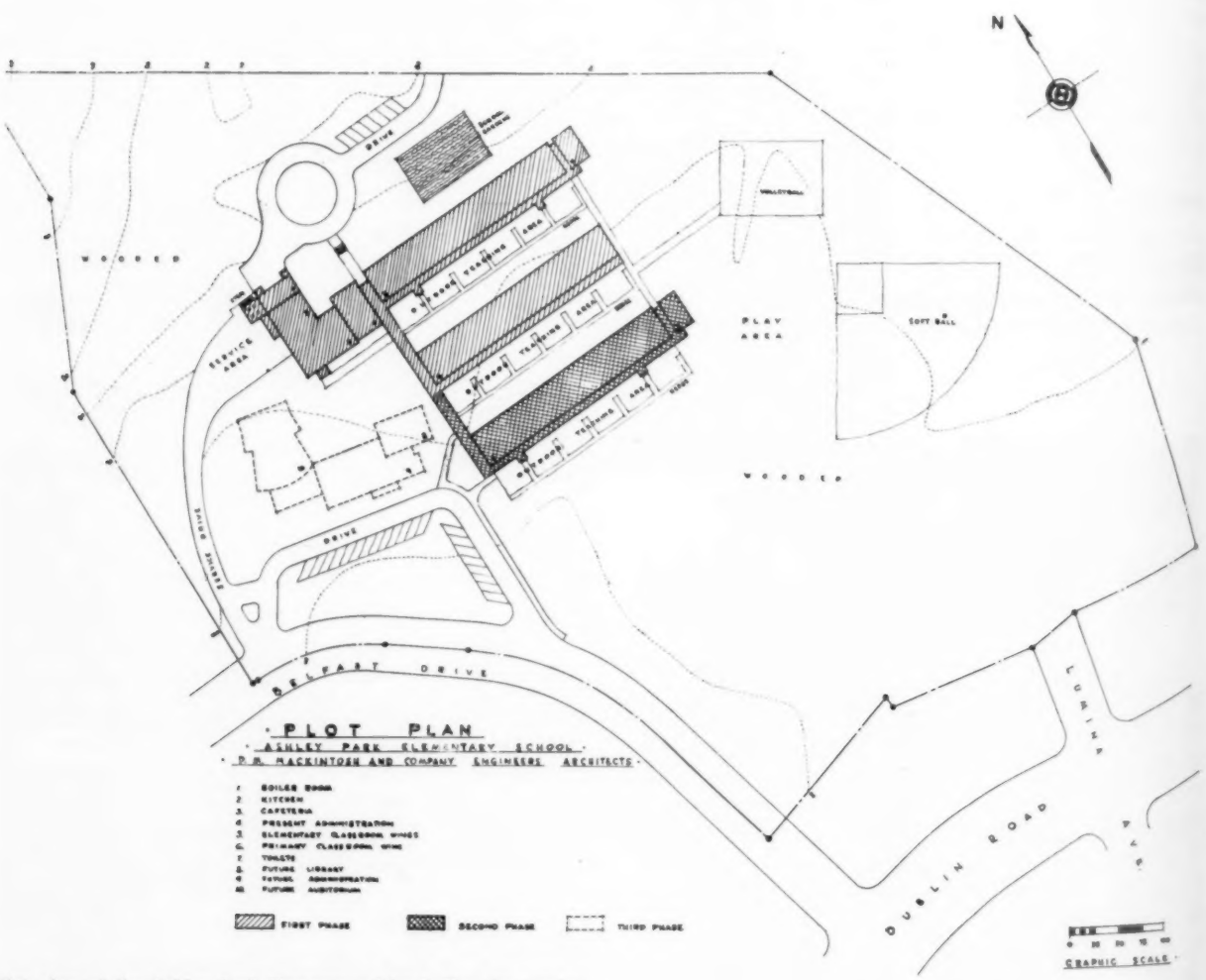
classrooms each, the cafeteria, kitchen and boiler room have been constructed. A new wing which will give the ultimate classroom area is presently under construction. An area adjacent to the cafeteria is momentarily used for administrative purposes and will be converted to storage rooms when the entire plant is completed.

The school is heated with radiant coils in the concrete floor slab. It is constructed of an exposed slag block interior; with a Norman brick exterior. The roof construction consists of steel joists with a 3-inch vermiculite roof deck. All ceilings are treated acoustically with *Fiberglas* acoustical tile. Fluorescent lighting is used throughout. Due to the extensive length of the classroom wings, joints are provided between units of three classrooms in an effort to eliminate the cracking of the slag and of the brick exterior wall construction.

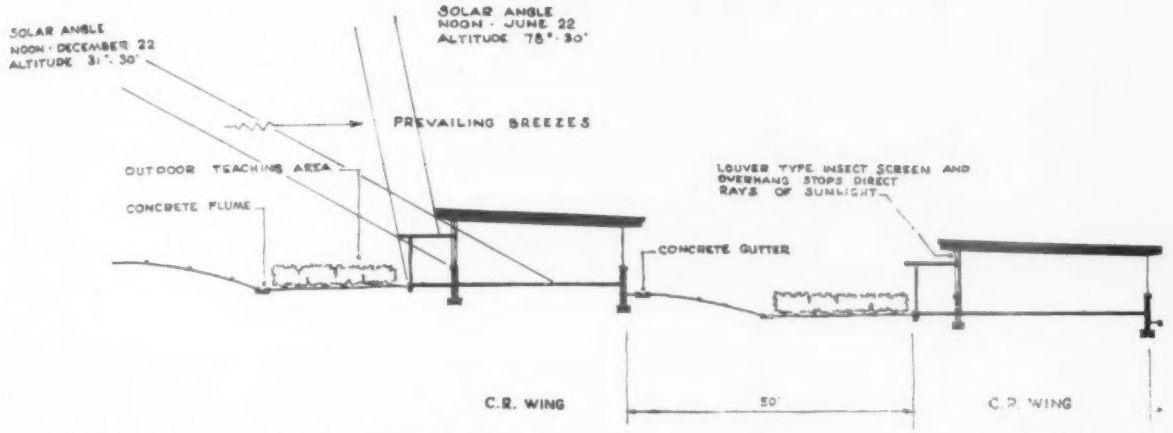
Site Considerations

The school is located on a beautifully wooded 12-acre site. The terrain would have offered little or no playground area had the school been located on the level portion of the site. Therefore, it became apparent that it was desirable to construct the building on the abruptly-sloping portion of the site. This choice proved to be advantageous in the orientation and over-all design of the school plan.

Classroom wings are orientated in such a manner that open corridors are located on the south side. The corridor roof is kept low and projected enough to completely shield the windows from direct sunlight. Clerestory windows above the corridor roof are treated with aluminum louvered screens to eliminate direct sunlight and to filter and direct light toward the center of the classrooms. The entire north walls of the classroom wings are of glass. Skyglare from the north exposure has presented no problem because of the high light intensity from the south which gives, for all practical purposes, a uniform light-meter reading across the entire width of the classrooms. No Venetian blinds, or any other type blinds, were planned for these classroom wings; and, in talking with the principal and teachers, one finds that they are all pleased with the results so



Plot plan of the Ashley Park Elementary School. The site consists of 12 acres with the building located on the sloping portion. This was done so that ample playground area could be provided.



Section view through the classroom wings of the Ashley Park Elementary School. North walls of the wings are glass with skyglare no problem because high light is from the south.

far. The elimination of blinds or shades reduced the initial cost of the school and did away with a big maintenance item.

Classroom Facilities

The classrooms are 32 feet by 36 feet with all division partitions constructed of *Parana* pine treated with a filler only. This permits the use of thumbtacks without destroying any finish. Cabinet space and shelving was constructed around all available wall space. Each classroom has a work-sink and approximately twelve feet of copper planting boxes. Six of the classrooms, used for the first and second grades, were constructed with toilet units connecting the classrooms. Lively colors were used in the entire project to give a cheerful and friendly atmosphere.

The first phase of construction, which consisted of 12 classrooms in two wings, cafeteria, kitchen, boiler room, and a small administrative area, was built for $10.15 per square foot. The kitchen equipment contract amounted to $7,487.88, and site improvements $16,-738. The total cost of the first phase of construction was $272,168.

Double Oaks Elementary School

On the northwest quadrant of the city are two Negro housing projects which pointed to the need for a large elementary school there. The ideal site from the standpoint of population was a rugged wooded area of about 12 acres between the two projects. Mr. A. G. Odell was given the commission to design a school for the site, a most difficult assignment as anyone will admit in studying the plot plan. The final decision to construct the primary wing and the administrative spaces on one side and the grammar grade wing on the other side of a deep ravine (approximately 23 feet below existing floor levels), connecting the two with a bridge, was arrived at after careful study and by many interviews.

At the present moment, working drawings are being completed for a ten classroom unit on the opposite side of the swale. Thus, when completed during the year, the school will contain 18 classrooms, a library, cafeteria, auditorium and administrative spaces. While the terrain has made construction difficult and more expensive perhaps, it has given space that is most useful for storage and for workshops. The staff is now planning for appropriate use of the area under the bridge. If those plans materialize, an outdoor theatre will emerge with a stage under the bridge at its high point.

Ceilings and Floors

In the construction of the Double Oaks School the architect tried to make as much use as possible of the principles of economy and of the teachings of science as applied to buildings. For example, the ceiling finishes are exposed concrete roof decking and exposed steel except where perforated acoustical ceiling panels were required, or where plastered ceilings were installed in the kitchen in order to meet sanitation requirements. The floors are of concrete slab on the ground covered with asphalt tile. The open corridor floors are exposed concrete slab.

An interesting innovation in this building is the composition of the walls. They are of exposed brick or concrete masonry throughout except for exterior spandrels which are of porcelain enamel backed up with two inches of rigid insulation. The porcelain enamel panels are finished in different colors in order to further identify the various classrooms to the elementary students. The bright colors add much to the attractiveness of the building.

Glass Wall Partition

An interesting use of glass is made in the partition wall between classrooms. Plate glass is substituted for brick in the space near the ceiling. The effect of these large sheets of glass is most pleasing, giving the impression of even greater space. It may be pointed out



Front view of the Double Oaks School, A. G. Odell, architect. The lunchroom, auditorium and library are on the left, classrooms are on the right and administration areas are in the center. Landscaping had not yet been completed at the time photograph was taken.



Primary classroom in the Double Oaks School. There is a great amount of light in these rooms. Plate glass is used in the partition wall above the chalkboard.

that the major materials used in this building are brick and glass and neither requires re-painting every three or five years. Nor do the porcelain spandrels require painting. Hence, maintenance costs for this school should be lower than for most schools.

The classrooms in the Double Oaks School appeal to the primary teacher. Each one is equipped with a sink, a 12-foot copper planting box, a portable stage, a clock, ample storage cabinets, room toilets and space sufficient to have different groups at work or study in their own area without interfering with the others. Each classroom has two doors, one opening on the covered walkway and the other to the outdoor teaching area on the opposite side.



Molitor Photos

Cafeteria of the Double Oaks School. Walls are of exposed brick and concrete masonry, as they are throughout the building.



The Double Oaks primary room is an inviting place for work, study or social activities. There are wide window areas, ample storage provisions and planting boxes to add to the appearance of the room.

The school library offers a most pleasing retreat for pupils and teachers. Separated from the reading room by a partition is an outdoor reading court which is the roof of a storage place underneath. In the autumn and spring, particularly, this additional space offers room with an appeal that no indoor space can match.

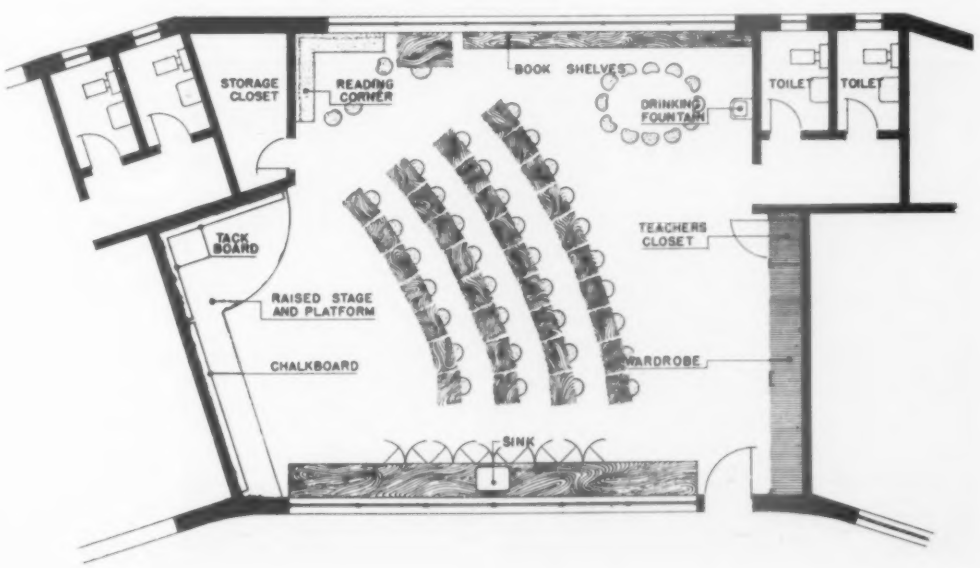
Elizabeth Elementary School Addition

No description of the building program in the elementary schools of Charlotte would be complete without giving some attention to the addition made to Elizabeth School. Situated on a sharply sloping site, the addition follows contour in the form of a curve. While the classrooms open onto a covered walkway which is on ground level, the hill enabled the architect, Mr. C. H. Reed, to plan special rooms which are on ground level at a lower point.

The bilateral lighting of primary classrooms in this building is most satisfactory. With the covered passage and directional glass block on the south no direct sunlight gets into the rooms. The view on the north side is of a city park and playground. The view to the south is a green lawn between the covered walkway and the streets. The angular plan and interior walls add to the informality of the classrooms and to their flexibility. There is no shortage of storage space with shelves and cabinets in the room and a closet for recreational equipment and educational aids.

Orthopedic Section

An interesting feature of the addition is the orthopedic section for physically handicapped children. The floors will not get slick, walls are padded for sound as well as protection and have continuous handrails. All plumbing fixtures are mounted with special trim. Training aids are provided for speech therapy as well as physio-therapy where, unobserved, these children can be taught to help themselves.

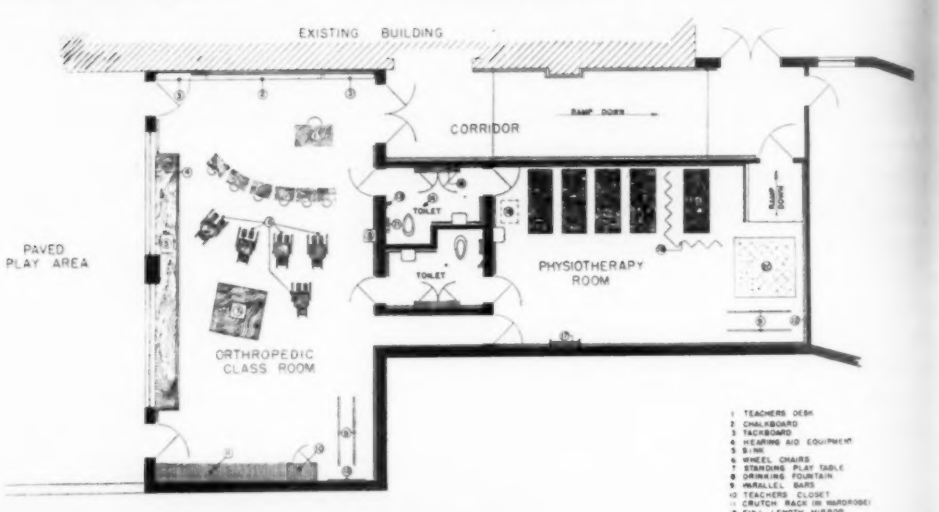


Typical classroom plan of the Elizabeth School Addition. Architects are Biberstein, Bowles and Meacham, Inc.

Delmar



Light for Elizabeth Elementary School is provided by a wall of windows on each side of the classrooms. Control of light is by the covered walkway and directional glass block above the walkway.



Plan of the orthopedic section of the Elizabeth School addition.



H. F. Rhoads

Primary classroom in the addition. The stage can be seen in the corner. Door leads to the room toilets.



Primary room in the Barringer Elementary School in Charlotte, J. M. Malcolm, architect. Pine paneling is used for partition walls. Perforated pine boards are used in the ceiling instead of acoustic tile. Lighting fixtures blend into the overall design scheme and enhance the soft textures.

Barringer School

Barringer School was in the capable hands of architect J. M. Malcolm who was very anxious to develop a school that would "not frighten little children" but rather attract and hold them. The twenty-four-acre site in a wooded area with a small stream on one side was an inviting scene for a creative architect to let his imagination have full sway. The planning was done in the winter and early spring of 1951 when the National Defense Program required most of the steel of the nation. Acting with the approval of the school consultants and the school officials, the architect turned to what is generally called *mill type* construction in order to avoid delays. The choice proved to be a wise one, and the product is inviting and substantial.

Maximum Use of Wood

More than any other school in Charlotte the Barringer School makes maximum use of wood. Every effort was made to design a school that would be attractive and yet would have a minimum of maintenance and operating expense. Since the school was planned for small children, ages 6 to 12, the architect strove to keep the general scale in harmony with children. Ceilings were lower than average; built-in features were planned to adjust to the differing ages of children. All classrooms are attractively decorated in bright and harmonious colors. Bilateral lighting is obtained in all classrooms.

The architect improvised a scheme in the use of acoustical treatments for this school by drilling holes in the underside of the exposed roof decking. He thereby eliminated the need for commercial acoustical tile which usually requires realignment or renailing. The treatment seems to have merit and is attractive.

The use of plaster, with its incessant cracking, was held to a minimum, being used only in the kitchen and in the toilet areas. White pine paneling was used ex-



Cafeteria in the Barringer Elementary School. The low windows with planting boxes create a pleasant atmosphere for the children. A drinking fountain is provided within the room for use by the diners.

tensively in classrooms, the cafeteria and office areas. This paneling was rubbed with lead and oil, then covered with two coats of flat varnish. This finish gives an excellent wearing surface.

For the walls a clay brick was used with one edge rounded, thereby eliminating all sharp corners on both interior and exterior. The exposed brick on the interior blends with the natural grain of pine paneling and the exposed wooden beams of the ceiling.

Heating facilities in this school, as in most of our new schools, are provided by means of radiant floor panels, thereby eliminating exposed radiators with their hazards. All electrical conduits are run above the roof deck, being placed between the layers of deck insulation. Generally, illumination is provided by means of incandescent, semi-indirect light fixtures. The fixtures are blended into the overall design scheme and enhance rather than detract from the room textures. The fixtures permit ease of relamping and general cleaning.

While the schools which have been described may represent a forward step in the design of school buildings, they are not to be regarded as the ultimate in school planning. Generally speaking, they assume that the classroom will accommodate 20 to 30 pupils and one teacher. There is also a dominant use of books, especially textbooks. Obviously, as the frontiers in the philosophy and psychology of learning and teaching are penetrated deeper, new concepts will develop.

Classrooms of the Future

Instead of classrooms of 1,000 square feet of floor expanse with certain spaces designated as the quiet area, the planning area, the industrial arts, science or art area, there may be much larger places, even individual laboratories radiating from the central discussion and exhibit area. These larger spaces might be constructed to contain a storehouse of resource material not only for study, but for research and practical purposes.

Instead of one teacher there will probably be several working cooperatively on problems of significance to children and to the community. The schoolroom of today thus represents only a stage in the evolution of a schoolroom that must always lag somewhat behind educational theory.



Glass-roofed corridors with fixed sash above and operable sash below on north sides provide weather protection and daylighting. Smooth redwood and natural blue-gray native stone combine in a harmonious exterior pattern. Stone walls serve as wall space for lockers in the Punahou School, Hawaii, Vladimir Ossipoff, architect.

R. Wenkam Photos

PUNAHOU ELEMENTARY SCHOOL IN HONOLULU



by JOHN F. FOX

President, Punahou School, Honolulu, Hawaii

John F. Fox received his B.S. degree from the University of Missouri and his M.A. and Ph.D. from New York University. He has also completed some post-doctorate studies at Northwestern and Columbia Universities. Before becoming president of Punahou School in 1944 Dr. Fox was superintendent of schools in East Hartford, Connecticut, and supervising principal in Bridgewater Township. He initiated school surveys during his terms in both posts. In 1946 he brought to Hawaii Dr. N. L. Engelhardt, Sr. whose study of school building needs has formed the basis of Punahou's building program.

PUNAHOU School's modern Mary Persis Winne elementary units were designed for Hawaii's century-old independent school by well-known Honolulu architect Vladimir Ossipoff. The units developed from two contemporary educational and architectural concepts: unity with the outdoors and adaptability to progress.

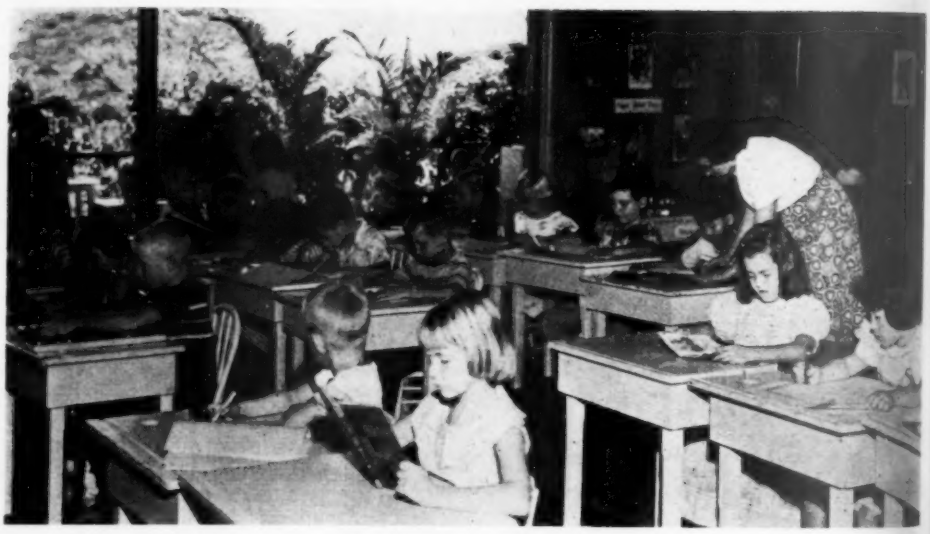
Convinced that any school facility is valuable to the degree that it engenders a spirit of happiness and productivity, Punahou School aimed at an elementary structure which would fuse the hopes, ideas and feelings of those who would use it with the blue sky, warm sun, trade winds and green palms which are the special loveliness of Hawaii.

Punahou's 72-acre campus is a documented history of school design in Hawaii since 1841. Its spacious campus is home to more than a dozen buildings of as many architectural styles, housing students from kindergarten through twelfth grade. Punahou's first home was a masterpiece of missionary ingenuity and hard work; with their own hands the school's founding fathers laid stone foundations and raised walls of adobe made from taro-patch mud bound with "pili" grass. The first building was topped with a thatch roof, as were the homes of the native Hawaiians.

The progress of school design since Punahou was founded in 1841 is marked in the stone and mortar of campus buildings—the clean, severe New England lines of Old School Hall, 1852; the "monument to education" implicit in the domed, turn-of-the-century Pauahi Hall; and the "imported mainland" design of Bishop Hall were milestones in educational building.



Tropical planting is extensively used for screening as well as for color and visual interest in gardens on which all classrooms open. The wide overhang on the south side provides a lanai or sheltered area. This is an integral part of classroom activity. Wall length sliding doors open the classroom to lanai and garden.



Spacious classrooms in the Punahou Winne Elementary unit provide working area for a variety of activities.

Damon Library's neutral wood panelling and extensive use of glass walls maintain the open quality typical throughout Winne units. Tables, chairs and shelves are scaled to the youngsters' needs.



Adaptability has been apparent during Punahou's century of growth. In its most recent elementary additions the school has moved well into the forefront of Hawaii's modern school planning. Original plans for the complete 27-classroom unit were drawn up by Mr. Ossipoff, who designed a unit in the modern architectural manner, making the most of Hawaii's world-famous climate. Since the Winne buildings were planned for elementary children, a committee of youthful students as well as teachers participated in initial planning, expressing their own views and preferences.

Development by Stages

Punahou is an independent school with income only from private sources. Therefore, its long-range plans for the 27-classroom unit containing, in addition to a library, an audio-visual room and administration offices, are being developed in stages with desirable changes incorporated in each addition.

The theory of accessibility motivated the self-

contained classrooms opening onto individual *lanais*, the delightful Island adaptation of porch or veranda. The hub of the seven classrooms now in use is the elementary library within easy reach of students and teachers.

Construction of the Winne units was a splendid opportunity to incorporate modern concepts of design with Hawaii's superb outdoor living. Each of the seven classrooms now in use is spacious, light and airy, 30 feet by 38 feet, with an individual lanai 10 feet by 38 feet, giving each child an area of more than 40 square feet. That area is based on a class of 30 students; however, Punahou, stressing high standards, has set 25 students as its standard class size, which considerably increases the 40 square feet per child. These units and the Damon elementary library were completed in 1950.

Native Materials Are Used

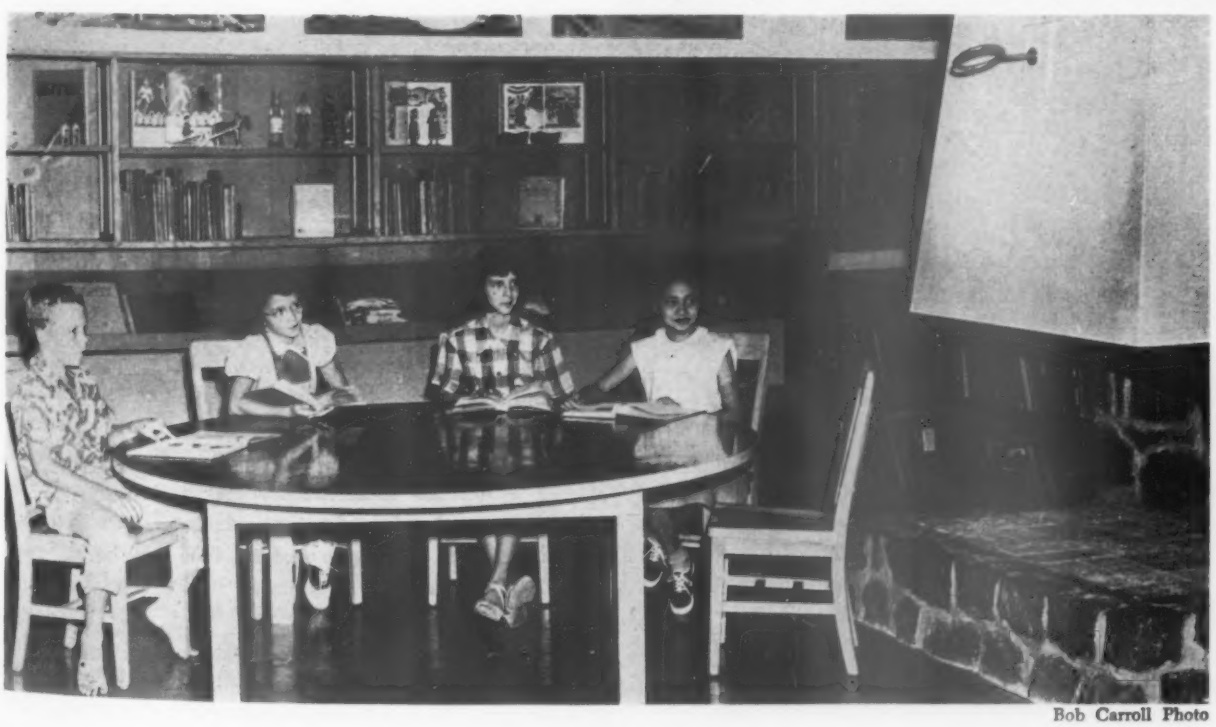
Native lava rock on the lower exterior walls is harmonious with the unit's location on the slope of extinct volcanic Rocky Hill, a campus landmark. The rugged facing plays a practical part in the over-all design. Its rough surface is impervious to chalk, pencil and crayon scribbling traced by idle fingers. The stone exterior wall serves also as solid backing for the thirty lockers in each classroom.

Natural, termite-resistant redwood rises above the blue-gray stone walls, forming both exterior and interior paneling. Glass-roofed corridors on the north



Side elevation of new classroom units planned for 1954, showing provisions for insect-proof lunchbox storage cubicles. These are isolated from structural walls by an oil-bath area. There is ample space for tackboard where children's murals may be displayed. Vertical redwood strips can be installed over the solex glass to give complete sun control.

Punahou children have made the library a creative center. Art displays brighten acoustically treated walls, and story hours around the open fireplace at the left entertain students of all ages.

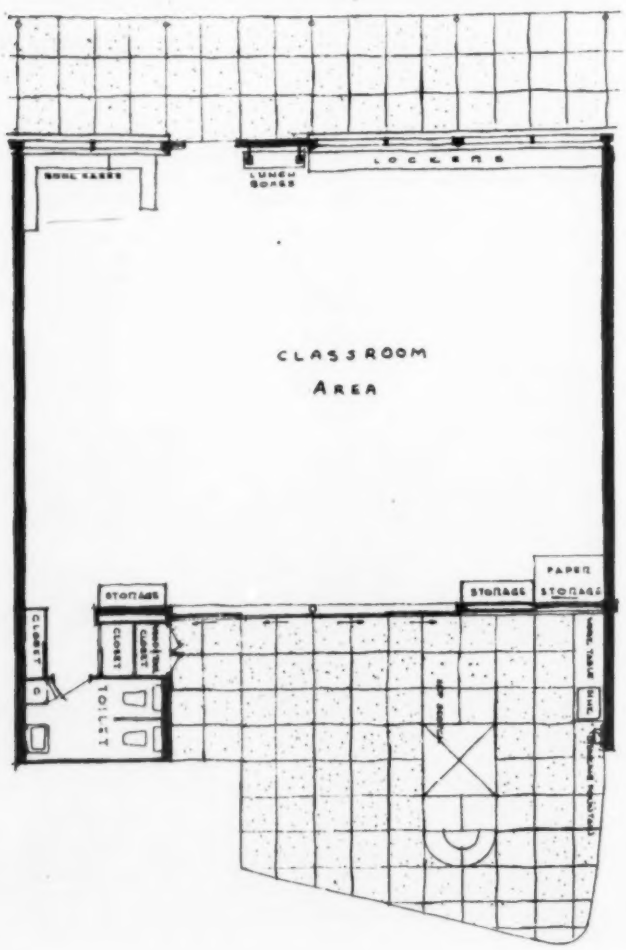


Bob Carroll Photo



In each classroom work and play patterns have been evolved to suit the needs of students and teachers. Furniture is arranged to suit the activity in progress.

This classroom plan is scheduled for construction in 1954. It is consistent with original drawings used in the 1950 construction, but will produce a more efficient room with better storage areas.



side of all three wings, with wide-roofed overhangs on the south sides, give complete protection from Hawaii's sudden "liquid sunshine," trade winds and bright sun. Windows above the glass roofs have fixed sash, while those below swing in for ventilation. Wall-length sliding doors open all classrooms to lanais and plant-screened gardens which are an integral part of class activity. The gardens, with their vivid Hawaiian flowering trees and tropical plant borders, serve as outdoor classrooms for nature study projects.

The exterior natural color scheme with off-white steel framing is brightened by red pipe columns. Interior decoration emphasizes the use of individual colors. Each classroom is identified by its own color scheme, dominant in the asphalt tile floor covering. The floor surface has been applauded by teachers. Its large checkerboard design makes possible orderly desk arrangements for all class projects.

Children Take Part in Planning

Important factors in the Winne planning were the intangibles in school design, emphasizing the warmth of human relationships which a liveable, gay, home-like school room develops among students and teachers. Because the children were invited to take part in the initial planning, their sense of pride and ownership in buildings scaled to meet their emotional, physical and mental needs, has been evident. The elementary teacher feels the same quiet pride. In the self-contained classroom her equipment is always at hand and her sessions run smoothly.

From the Punahou educator's standpoint, the "emotional climate" of a classroom must be a happy, even one. The freedom of mind and action which each

classroom provides promotes mental health. There are no barriers to work and study activities in the outdoors, no obstacles to free enjoyment of Hawaii where natural beauty teaches its own lesson.

School Feels Like Home

Winne unit students and faculty feel that it is their home. They helped in its planning and dedicated it to Punahou youth at the opening service three years ago. The equipment is adjusted to their needs, all materials for a rich school day surround them. Each room's 1,140 square feet provide an area for all academic activity, indoor play, resting, creative art, drama and story hours. The teacher may arrange her room so that group and individual academic work go on side by side, while painting or clay work takes place on the lanai. As both large and small group activity progresses, the teacher has time for personal attention to her students, a basic requirement in a fine independent school.

"Audicane" acoustical treatment of classroom ceilings has combined with the children's respect and pride in their school home to bring quiet and order to the three wings of the unit already in use. There is the distinct atmosphere of a happy, well-organized workshop developed through the sense of teamwork and social awareness, inspired by the buildings.

Damon Library, the hub of the units, is a large, inviting room which maintains the intimate scale and open quality typical throughout the plan. Design revolves around the children who use the library daily. Bookshelves are accessible to the smallest child, quiet reference corners are available to older students, and a window wall and carefully planned indirect lighting assure strain-free reading and study. Story hours around the fireplace, open on all four sides, have become a tradition, drawing all ages into a warm circle of interest.

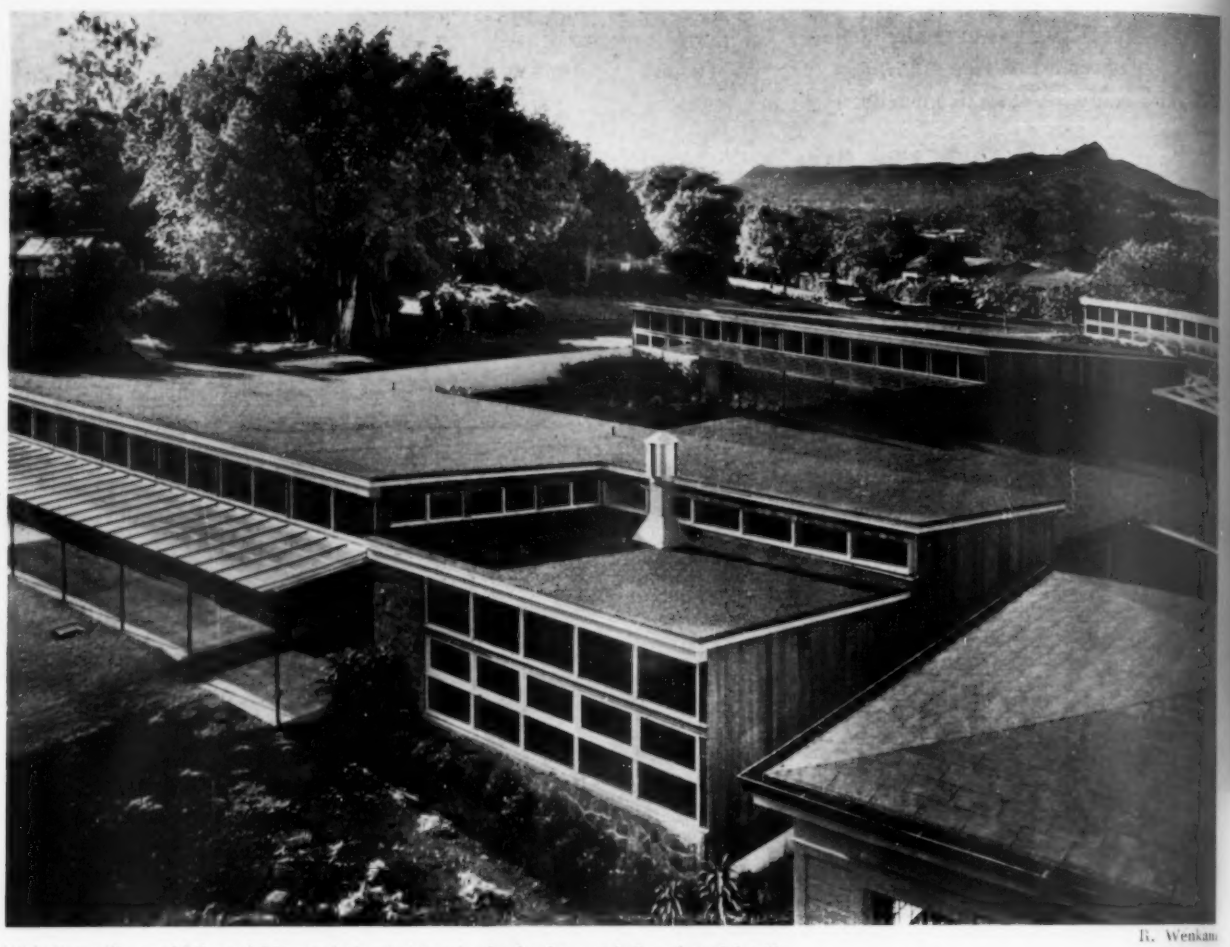
By September of 1954, two additional units containing ten classrooms will open their doors to elementary students. Though the original plan remains virtually unchanged, adaptability is stressed by im-



The teacher in the Punahou School has time for personal attention to her students in both large and small group activities.



Each classroom is identified by its own color scheme, dominant in the asphalt tile floor covering. The large checkerboard design of the floor surface makes possible orderly desk arrangements for various class projects.



R. Wenkam

With Hawaii's world-famed Diamond Head rising in the background, Punahou School's Mary Persis Winne Elementary units spread over a gently rolling campus slope. Designed by Honolulu architect Vladimir Ossipoff, the Winne units are outstanding examples of modern educational design in the Hawaiian Islands. The window wall in the foreground fronts the Damon Elementary Library, while the three wings containing seven classrooms are ranged behind.

provements evident in the second round of construction. Cost of the first units, seven classrooms and library, was $153,000. Final figures for the projected additions will be determined in 1954.

The four-year lapse between construction gave Punahou administrators and teachers an opportunity to re-evaluate the units in the sharp light of daily use. While the new buildings will remain in character with the whole scheme, details will be altered to eliminate waste space and increase classroom efficiency.

Design Changes in New Units

Design alterations include a change of storage units to decrease pieces of immovable equipment. An area at the end of each lanai will be devoted to storage with the inclusion of lavatory facilities contemplated for primary units. An innovation in construction is found in the insect-proof lunchbox storage cubicles, isolated from structural walls by an oil-bath area. To extend areas where children's murals may be displayed, tackboard spacing will be developed further. Again, with youngsters in mind, the lanai surface pattern will be laid out in hop-scotch squares for specific game activity.

Punahou students, faculty, parents and administrators have unanimously approved the Winne plan. The unification of education with Hawaii's unparalleled outdoors has been successful; a "liveable" school has resulted. Warmth of Hawaiian sunshine, coolness of tropic trade winds have blended with clear glass, redwood and native stone to produce a fascinating pattern of school days in Hawaii.



Joseph W. Molitor

Social science laboratory of the Myers Park High School, Charlotte, North Carolina. J. N. Pease and Co., architects. This classroom is designed for a wide variety of activities and many different learning situations.

TRENDS IN EDUCATIONAL SPACES IN JUNIOR HIGH SCHOOLS



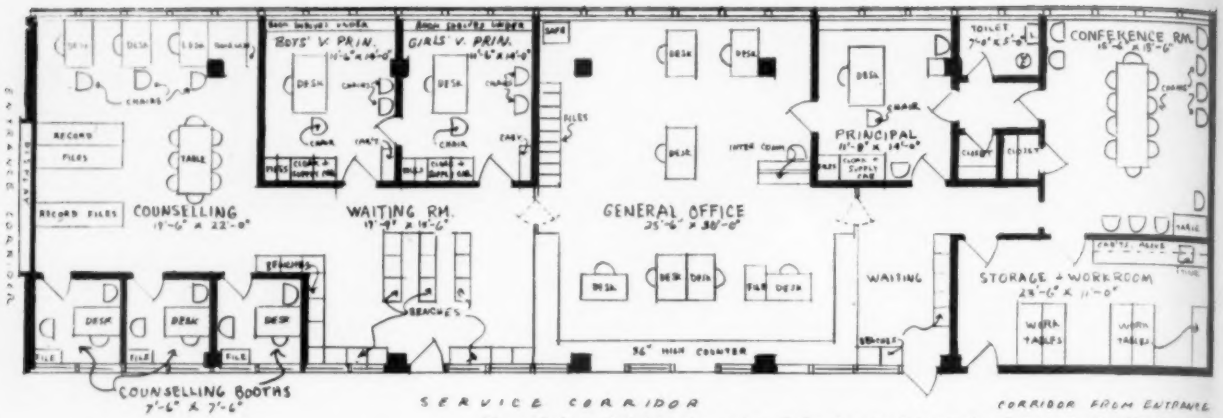
by STANTON LEGGETT

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

Dr. Leggett was a Henry Evans Scholar at Columbia College where he received his A.B. degree and held the Eleanor C. Morris Fellowship at Teachers College, Columbia University for his M.A. degree. He also received his Ph.D. degree from Columbia University. Dr. Leggett held teaching and administrative posts in New York and New Jersey and also taught at Syracuse University and the University of Illinois. His work as educational consultant has brought him into close touch with school systems throughout the nation.

THE next fifteen years or so will undoubtedly see the most intensive construction of school buildings on the secondary level that this country has ever experienced. Because of many factors, chief of which is relative economy, there will probably be the first large-scale construction of intermediate schools or junior high schools. The secondary school building boom of the 1920's concentrated on four-year high schools. The building period of the 1960's is more apt to concentrate on senior high schools of three years' span supported by two or three junior high schools, at least in the urbanized section of the country.

Most junior high school buildings now in existence are converted high school buildings, used for the younger students when the small site of the building made a new senior high school desirable. Few buildings designed as junior high school plants have been constructed. Most of these have been smaller reproductions of senior high schools. The characteristics of the junior high school must be fully explored if true



Plan of the administrative suite of the Sunset Community Center Junior High School, San Francisco, California. Architects are Harry A. Thomsen and Aleck L. Wilson.

intermediate schools are to emerge as today's realities.

The Intermediate School

The words "junior high school" and "intermediate school" have been deliberately used interchangeably in the above discussion. The stereotype school between the elementary unit and the upper years of secondary school has been the three-year junior high school serving grades seven, eight and nine. Members of our organization have recommended, as far back as the 1939 Survey of the Public Schools of St. Louis, Missouri, that increased attention be given to a shift in the span of the intermediate school to a four-year range serving the fifth to eighth grades.

As time goes on such a school appears to be more and more inviting, with apparently equally good results in the elementary and upper secondary schools. Next to the almost hopeless confusion in the curriculum of the senior high school, one of our greatest unsolved problems in education is the loss of time, enthusiasm and opportunity that children suffer in the upper elementary school.

What applies in this discussion to a junior high school applies, in the author's judgment, with even greater force to the four-year intermediate school.

Again, where six-year high schools are planned, it is perfectly possible to design the building so as to provide individuality for the junior high school section. The common elements of auditorium, gymnasium, library, cafeteria and the like can be located between the upper and intermediate school.

Size of Junior High Schools

The size of a junior high school, assuming sufficient numbers of children to allow choice, will represent a compromise between the desire for smallness to achieve intimacy and understanding of individual students and the desire for largeness to achieve economy. From study of the issue it would appear that 300 students represent the minimum practical size and 800 to 900 students the optimum maximum size, with 1,200 students as the absolute maximum for a junior high school.

Increasingly, the compromise can be made workable best if the economical larger unit is developed as a series of smaller schools sharing expensive general facilities such as auditorium and gymnasium and having the advantages associated with small numbers of students. This is the "school within a school" of which the Evanston Township High School is one type and those developed by Dr. Michael Lucy at Julia Richmond and Forest Hills High Schools in New York City represent another type.

The School Within a School

Two new junior high schools in Columbia, South Carolina, and several being planned in Charlotte and Mecklenburg County, North Carolina, are representative of this approach. Lafaye, Fair and Lafaye, architects of Columbia, South Carolina, working with Guy L. Varn, superintendent of the Columbia schools, a large number of staff members and Engelhardt, Engelhardt and Leggett, educational consultants, have developed a plan for a new junior high school that involves three schools of approximately 300-pupil capacity for a total of 900 students. There is provision for adding a fourth "little school" if circumstances so decree.

Schematically, each "little school" involves several general purpose classrooms, a general shop, an arts and crafts studio and a home arts laboratory. Shared by all of the "little schools" are student activity spaces, administration, cafeteria, music rooms, gymnasium and auditorium. The major specialized areas such as shops, arts and home arts are rescued from their conventional isolation and restored to a focal position in the heart of the school, closely associated with the classroom core.

As suggested in detail later, science has, in this approach, been incorporated into the general classroom

so that a seventh grade, for example, might be taught by one teacher covering all subjects, including science. Or the room might be used specifically as a general science room in a departmentalized program.

Schools within schools can be organized as a horizontal section, one for each grade, for example. Again, they might be organized vertically, with each "little school" serving three grades. Local problems may require one or the other, but there is some preference for the vertical organization. Of course, irregularities in numbers to be served are common, and there will probably be many variations in combination in use.

Degree of Decentralization

The degree to which the "school within a school" may decentralize to become a self-sufficient unit will vary as the advantages of isolation are weighed against the advantages of mixing in the larger group. In a very real sense, however, this is not an "either-or" type of decision in several important aspects. For example, as the educational program is analyzed, it may well be shown that the student-directed activities of a school, such as clubs, student organizations and the like, represent a major aspect of the school program. As the school increases in size, the need for more significant opportunities for children to take effective parts in this phase of the program will become apparent.

If student activity space is provided within each "little school" as well as for the larger unit, more students can take active parts in the program. For example, each "little school" might have a visual education club to take charge of and operate all visual education apparatus. A school-wide organization of these smaller clubs could serve to integrate the efforts, work for improved service and serve as a clearing house for improvement in practices developed in each smaller unit.

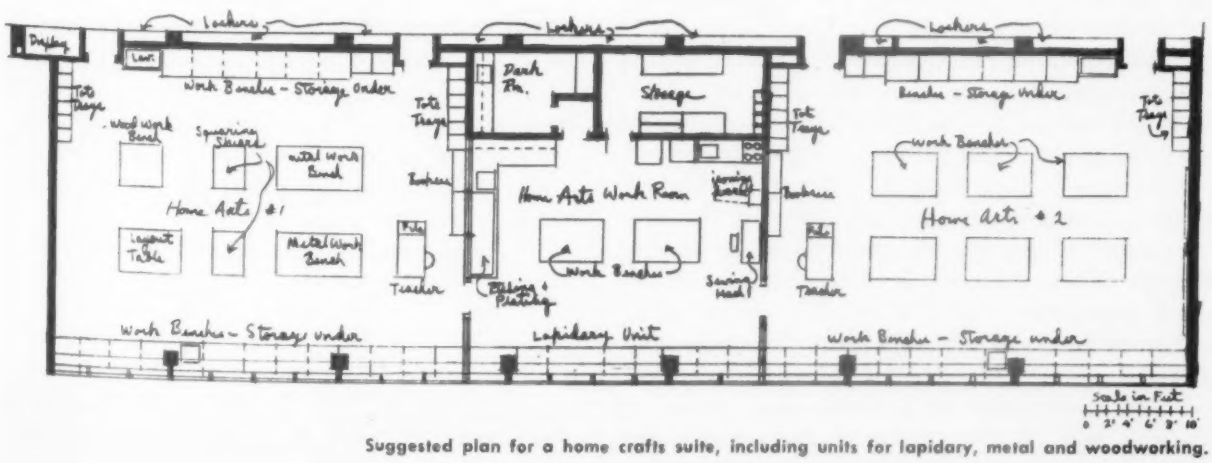
In this case, hypothetical to be sure, the desires of the staff for the use of student time might well call for more space for both the small school and the larger unit, as far as student activities are concerned.

Library facilities, in terms of richness of resources of books and staff, appear to be the better for continuation of centralization supported by classroom library collections and collections of books in specialized spaces. It is conceivable, however, that if an educational program demanded it, the central library would be a service, storage and distribution point, with library collections provided in each of the "little schools." If the library, so planned, could be properly staffed, there might well be advantages that would overcome the disadvantages of duplication and less paper-work efficiency.

Cafeteria Arrangements

The cafeteria represents an area where careful planning studies might reveal considerable advantages in decentralization. A large school with a good lunch program will require a veritable monster of a cafeteria, if done in the traditional style. Some advances have been made in breaking the large cafeteria dining area into smaller spaces in order to lose some of the "gorge and go" characteristics and, if possible, to fit the resulting spaces for greater use. The usual dining area actually has a very low use factor, which in itself represents uneconomical practice.

If group space can be made available in the "little school," for example, by widening a corridor, or if a room is set aside for this purpose, or if someone thinks up some other better approach, it could develop that the food might be prepared at one location and served in each of the "little schools." The mobile, electrically-heated food cart and the vacuum container in a food cart have put the cafeteria on wheels. The food could be prepared at a central kitchen for the school or the central kitchen for a group of schools. The latter arrangement has been developed in a few places and has been shown to be economical, both in original cost of space and equipment and also in operating.



Suggested plan for a home crafts suite, including units for lapidary, metal and woodworking.

Such modifications in traditional cafeteria arrangement would have minor significance except that the changes suggested could, if well developed, appreciably increase the impact of the lunch hour (or twenty minutes) upon the educational program. When a junior high school class or group of classes could, on occasion, use the lunch period for a group meeting of some type, a unity of approach and a chance to develop good social habits become possible. It would seem that our modern secondary school cafeteria procedure is organized so as to ruin digestion and manners. In reality, just the opposite should be the case. Can the plan of a building change for the better the habits of those it houses?

The music area, traditionally, has been assigned the nuisance role in school building planning. It should be located so as to avoid interference with the use of other spaces. Surely, with the advances in knowledge in the field of control of sound, music could be rescued from its isolation and placed where its resources are available without its sound interfering with other activities.

Auditorium Facilities

Auditorium facilities would, in all probability, be considered as a central type of space. In view of the limited use of an auditorium and the general inadequacy of large combination spaces, there is a need for the rethinking of functions involved. Possibly, in view of the cost of a 500- or 600-seat auditorium, a little theatre and a series of group assembly rooms, one in each "little school," might serve the needs of a school to a greater degree and at less cost. This assumes that community needs for the larger auditorium are met elsewhere.

The group assembly rooms, doubling as cafeterias, would have a greater chance of success if they were kept in scale to serve small groups of students. The nature of the solution of this problem would vary greatly with the community and educational program. A study of the anticipated use pattern would provide clues to the nature of the spaces that would best meet the needs of the school.

Administrative areas, similarly, should be studied to determine where the space may best be located. With the vast increase in staff time devoted to guidance, the guidance functions and accompanying space could largely be decentralized. Teachers' rest facilities would be scattered about the "little schools." The unity of purpose of the over-all school could be fostered through offices and teachers' workrooms centrally located. Again, the decision of centralization vs. decentralization should be reached in terms of purpose to be achieved.

The development of a school plant embodying thoughts such as these sketched above is the outgrowth of the educational program as visualized in a community. In weighing the advantages or disadvantages of various proposals, the over-riding consideration is the contribution of such a move to the educational experience of the student.

Classroom Is the Key

In most schools the plant must be planned so that an enriched departmentalized program might be carried on as well as any foreseeable type of integrated or core program. Change is in the offing for the secondary school program, and the buildings planned now must be able to adapt to the new curriculum as it develops. The key to the adaptation is in the classroom of the secondary school. If this fails, the building fails.

It is becoming clear that new, yet educationally obsolete, secondary schools are being constructed in which classrooms are thoughtlessly designed as educational straitjackets. "Standard' classrooms of from 600 to 700 square feet in size, equipped with tablet arm chairs, with some chalkboard, tackboard and a small closet, represent acceptance and even approval of lazy, textbook teaching. No matter what the direction of secondary education in the future, whether toward an enriched academic program or toward some of the changes involved in the core approach, a larger, more versatile and more effective classroom is required.

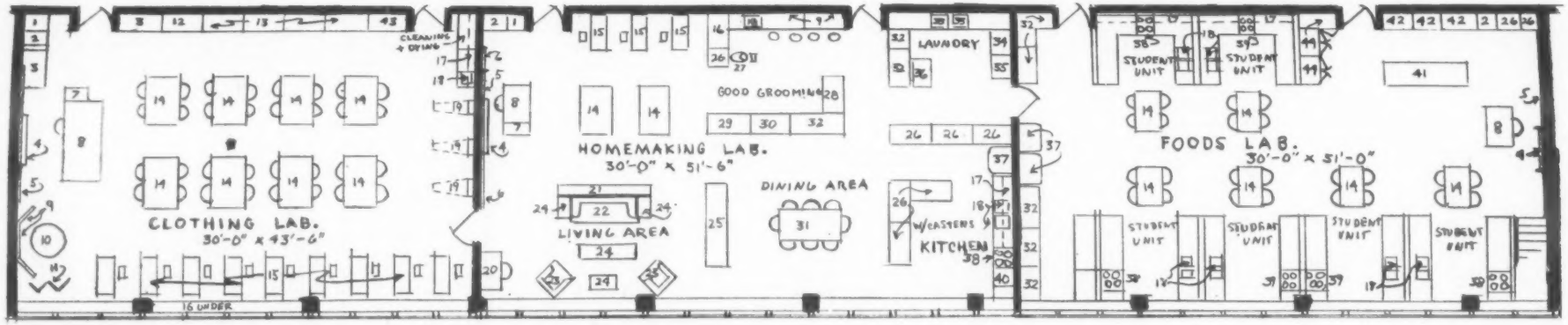
This is a strong statement. It is based upon exploration of the professional literature in the field of the theory of secondary education and upon countless talks with principals and teachers engaged in the practice of secondary education. The statement is most emphatically applicable to the junior high school level. In the author's judgment 900 square feet should be a minimum size for junior high school classrooms. Where some thought and effort has already gone into the development of a superior program for this age level, a good case can be made for larger classrooms.

Nature of the Classroom

To illustrate one pronounced trend that has widespread implications, consider the report by James D. Gault, principal of Piedmont Junior High School in Charlotte, North Carolina. Mr. Gault and his teachers spent considerable time during the last school year studying and revising a program of requirements[1] for a new junior high school in that city. Regarding classrooms, he states:

> Discussion and comments on this section reflected the conscious effort made at Piedmont in recent years to build our seventh grade program around the self-contained

[1] Engelhardt, Engelhardt and Leggett. *Program of Educational and Community Requirements, Junior High Schools, Charlotte, North Carolina.* The authors, 551 Fifth Avenue, New York City, 1952. 120 pp.



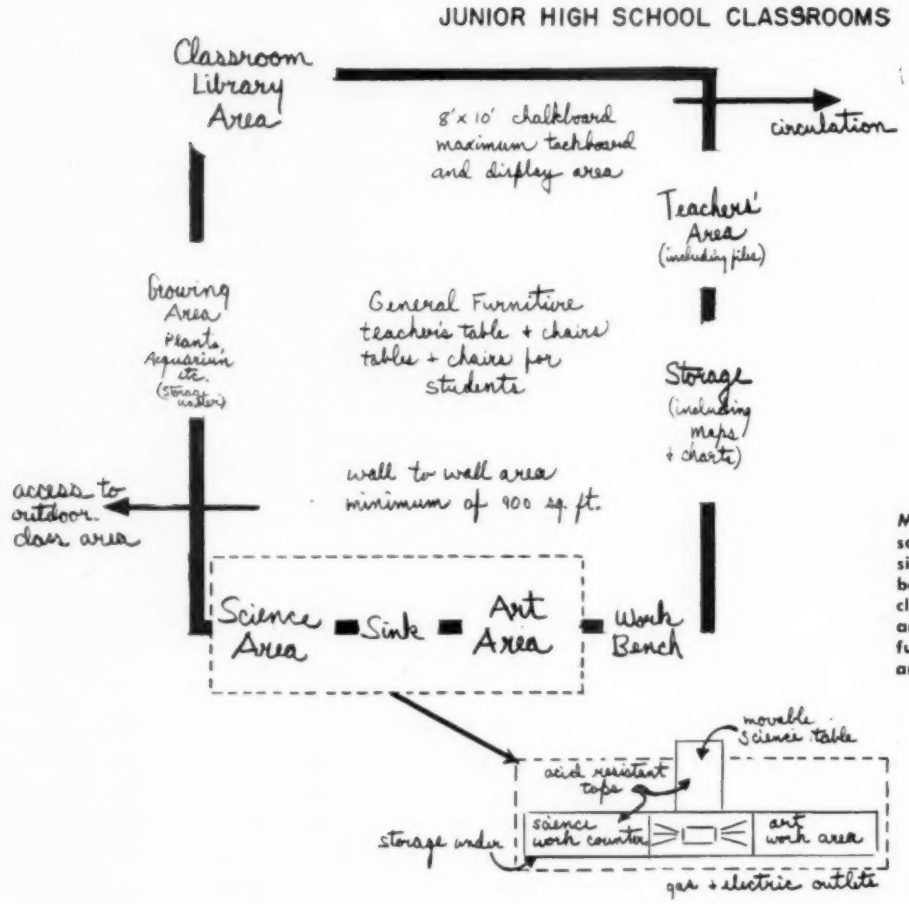
HOMEMAKING SUITE

LEGEND

1 Teachers' cloak
2 Visual aids
3 Students' wardrobe
4 Movie screen
5 Chalkboard
6 Tackboard
7 File
8 Teacher's desk
9 Mirrors
10 Fitting platform
11 Folding screen
12 Work table (extension board under)
13 Tote trays
14 Students' work table
15 Sewing machines
16 Sewing supplies
17 Storage cabinets above
18 Sink
19 Stationary ironing board
20 Desk
21 Bookcase
22 Sofa
23 Chair
24 Table
25 China & linen storage
26 Storage & supplies cabinet
27 Hair dryer
28 Roll-away bed storage
29 Care of sick
30 Child care
31 Dining table
32 Students' apron & book storage
33 Wash tub
34 Laundrymat
35 Electric dryer
36 Electric ironer
37 Refrigerator
38 Electric range
39 Gas range
40 Oven unit
41 Demonstration table
42 Kitchen equipment
43 Ironing b'ds & extra Irons
44 Food supplies & storage

Three major areas comprise the whole of this homemaking suite. They include a clothing laboratory, homemaking laboratory and foods laboratory. The homemaking laboratory is subdivided into living, and dining areas, laundry, kitchen and good grooming sections. There are six student units in the foods laboratory. Each unit includes a stove, either electric or gas range, a sink and a students' work table. There is also a demonstration table and storage for food and student equipment. There are two refrigerators here and an additional one in the kitchen of the adjoining laboratory.

MAJOR ELEMENTS OF JUNIOR HIGH SCHOOL CLASSROOMS



Major elements of junior high school classrooms include a sink, science and art area, work bench, storage, teachers' space, classroom library, growing area and provisions for the general furniture in use by students and teacher.

Science Area: Storage, acid-resistant work top, gas and electric outlets, near sink, movable science table butting against sink for demonstration.

Sink: Minimum size of 24″ by 18″ by 8″ deep. Aerator nozzle to reduce splashing. One foot splashback, drainboards both sides. In selecting sink material watch problem that general science chemicals will produce.

Art Area: Waterproof work surface, storage space in cabinets below work counter. Provide space for jars of paints, boxes of charcoal sticks, erasers, scissors and the like. Provide storage for 24″ by 36″ paper in shallow (3″) drawers. Five drawers desired with smaller drawers above.

Work Bench: Portable type with woodworking vise. Provide panel behind bench on wall for tools. Storage space for small amounts of wood, plywood, metal, nails, screws, paint, etc., needed.

General Storage: Storage required for following types of material:

1. Models, notebooks, displays, collections retained from year to year and used periodically.
2. Storage for models, displays, etc., that are in preparation.
3. Storage for textbooks and supplementary sets of textbooks in cabinets (possibly under sunboard at window).
4. General classroom supplies such as various kinds of paper in ream packages, standardized tests, pencils, erasers, rulers, etc.
5. Maps, as many as three or four at a time may well be in each classroom, drawn as needed from central audio-visual storage connected with library.
6. Charts—use shallow drawer of art area.
7. Storage possibly needed for outdoor tools.

Teachers' Area: Coat storage; locking cabinet for purse and other personal belongings; book shelf for professional materials; storage cabinet, locking,

for special collections of material such as items collected in community to illustrate studies. All arranged at adult working heights. In some cases teacher will use table and chair for general class use and will be provided with built-in desk surface and locking drawers for paper work.

Classroom Library Area: Shelving, adjustable, for minimum of 100 books; 8 books to a linear foot of shelving. Display for books on sloping shelf and display for pictures and posters on tackboard near library area.

Growing Area: Plants, aquarium, caged small animals, reptiles or birds may be found at one time or another in this area. Sunboard at window sill height, near water. Waterproof and sunproof top, storage below for general storage and for aquarium, cages and other items for growing area that may not be in use. Consider providing glass beehive in window area for one classroom in school.

General Requirements:

1. Eight feet to 10 feet of chalkboard with map rail above.
2. Maximum tackboard and display space. Provide for 3-dimensional display.
3. Two electric outlets.
4. Clock, preferably 24-hour, showing time in various parts of world. Minimum of one of this type to a building.
5. Working heights:
   a. Chalkboard—Top, 80 inches; Bottom, 34 inches.
   b. Chalkrail—34 inches.
   c. Work counter—38 inches.
   d. Sink—38 inches or adjusted to butt against movable science table.
   e. Science table—as available, preferably at standing working heights of 38 inches.

> unit plan and to extend the use of unified courses in the eighth grade. Such an organization would require many more general purpose classrooms in which an individual child would spend a large portion of each school day . . . Such classrooms would more nearly approximate a grammar grade classroom than a specific subject classroom usual in high school buildings.

In many communities some or all of the junior high school grades are taught so that students are with one teacher for more than one subject and in one classroom for at least one-half of the day. In this type of situation the Piedmont Junior High School teachers obviously could not carry on the type of program they desire in a "standard" high school classroom. The far-reaching changes in classroom design on the elementary school level must be pushed further up into the high school field with appropriate modifications in view of the types of activities that are carried on by the junior high school students.

The Emerging Learning Unit

One of the practical difficulties in having one teacher conduct a group of subjects on the secondary level is the difficulty of obtaining teachers who are competent in a variety of fields or who can be certified to teach in a variety of fields. Because of the rigidity of certification procedures generally, there is no necessary relationship between competence in a field and ability to acquire a certificate in that field. This difficulty is accentuated in the upper years of the junior high school.

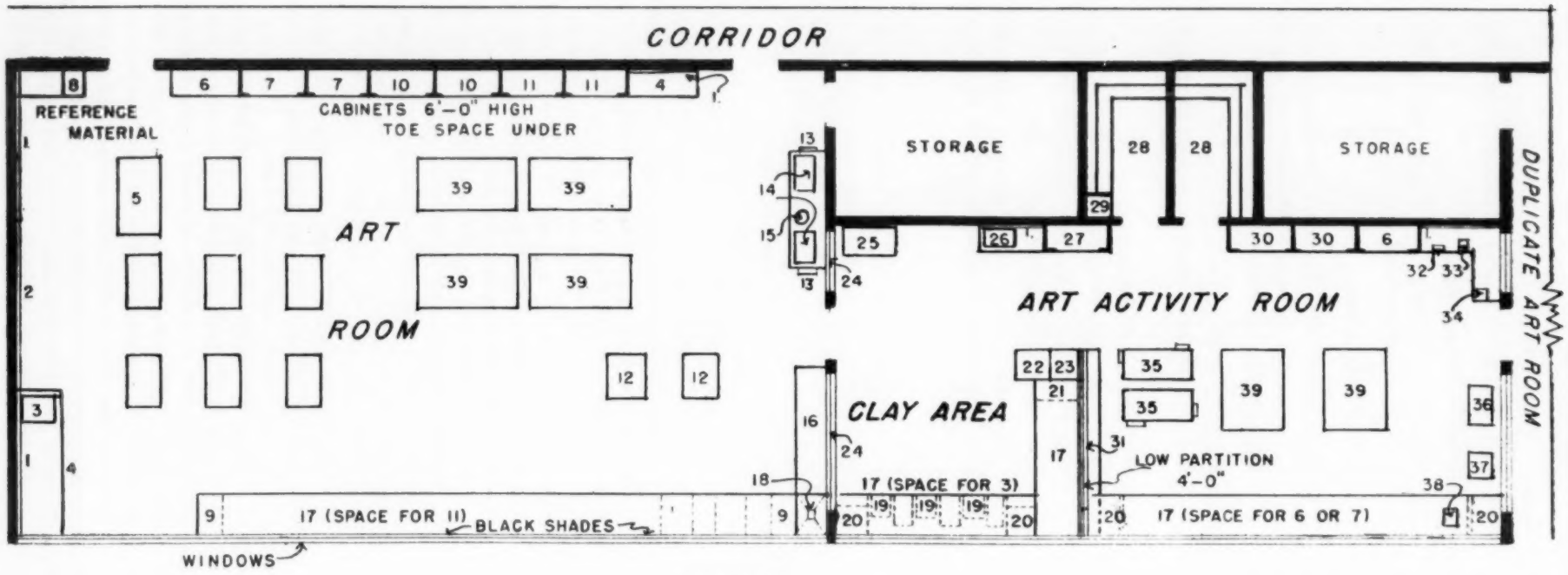
One approach which seems to hold promise is the creation of a learning unit in which a group of three or four classes with their teachers may work together so that a closer relationship in subject matter can be achieved and the varying fields of competence of the staff members may complement each other.

One simple aspect of a learning unit would be a grouping of classrooms such as social studies, language arts, general science and mathematics, so that the students involved in this grouping would spend as much as two-thirds of their time in this cluster of rooms. Carried further, the walls separating the classrooms might be movable or might be omitted for part of the space. Such a group would have a general work area and a series of discussion areas.

Such an approach, of course, would come out of an intensive exploration of the curriculum problems of a particular school. It has merit, however, in the stimulation that such an arrangement would have upon the educational program. When a school plant fails to stimulate the educational program, it is a sorry building.

Many Resources Available to Students

In the junior high school many kinds of resources are made freely available to students in the expectation that, by exploring such an offering, students will be able to narrow somewhat their fields of interest and concentration. This is very different from offering the student a narrow program in which he has little chance to widen his horizons of choice. The good junior high school systematically introduces a student to large



LEGEND

NO.	DESCRIPTION
1	Tackboard
2	Chalkboard
3	Paper cutter
4	Counter
5	Teacher's desk
6	Display cabinet
7	Supply cabinet
8	File
9	Drawers under
10	Tote drawers
11	Smock cabinets, shelf & rod
12	Floor looms
13	Towels
14	Clay trap
15	Waste disposal
16	Weaving storage
17	Knee hole work bench
18	Bin
19	Clay bins
20	Tool drawers
21	Bats
22	Wedging board
23	Wet clay
24	Clear glass
25	Kiln
26	Sink
27	Green
28	Bisque & dry storage
29	Kiln parts
30	Tool storage cabinet
31	Reeded glass
32	Grinder & buffer
33	Beverly bench shear
34	Jig saw
35	Wood working benches
36	32" square cutting shears
37	Movable anvil
38	Drill press
39	Table

An art room suite for junior high schools. This is composed of the main art room, a clay area, an art activity room and general storage areas. Storage cabinets also line the walls of the rooms.

segments of our culture so that, not only may he know about these areas of society, but also so that such experience may be used by the student in delineating areas for vocational and avocational interests.

Although this guidance aspect of variety in a junior high school has been given considerable attention, the three or four years in an intermediate school are more than a period of becoming ready for senior high school. The variety of opportunities offered contributes to the general education of each child. As a part of this general growth and development, junior high school students are at an age of great enthusiasm, high interest and genuine creativeness. The junior high school is unfolding before them, at an accelerated rate, the richness and fullness that the differing interests of people can provide.

This is the time to capitalize on the wide-ranging interests of the student, urging him to investigate and pursue ideas and activities that stir him. Probably no level of the school system can have quite the same opportunity of helping and watching children tackle new areas with so much enthusiasm. This requires specialized spaces that strike a fine balance between simple introductions for all students to widened areas of our society and challenging, advanced facilities for those whose interests are stirred and who will, under the drive of those interests, get a momentum of learning and inquiry that frequently carries them far beyond what is normally expected of students of that age level.

We generally underestimate the ability of the student, especially at the junior high school level. Given the right combination of teacher, resources and students, he will successfully tackle ideas and problems normally considered appropriate for more mature students. This implies that greater richness of resources is not limited to the addition of a few specialized rooms and teachers but applies, rather, to all areas of the school.

Home Arts Areas

Out of cooking and sewing classes has come a wide variety of courses dealing with the improvement of family life. As the secondary school program is now organized, a major portion of this type of training will be found in the junior high school. On this level most communities require some homemaking work for all girls. In time it will be required of all boys, particularly as the emphasis shifts to include home repairs, purchasing, budgeting, preparation for family life, bringing up children and the like.

Two approaches are found to the traditional homemaking program. One is to provide separate cooking and clothing laboratories. The second is to provide general homemaking laboratories covering all phases of home arts. This is particularly appealing for junior high schools. In either approach there is a tendency to provide some approximation of home conditions, ranging from a generally accepted living area to the more elaborate apartment or separate home arts cottage. The living room has a great theoretical attraction. The inclusion of such a space would have more practical advantages if it were used more in existing buildings and if a larger fraction of those installed were made more attractive.

Newer trends in homemaking provide for areas recently introduced in the program. In a number of schools workshops have been provided which allow for the study and repair of household appliances. Girls learn to replace fuses, and the world is brighter for their efforts. Expansion of this approach has caused the development of home crafts units which include a wide variety of activities beyond repair of familiar household items to the creation of new materials for use in the home. This is an expansion of the home workshop approach, involving a wide introduction to the crafts and designed for use by boys and girls.

General Shops

The general shop is well on its way to superseding manual training and other specialized shops at the junior high school level. Properly located, the shop serves not only for a course of instruction in the several fields involved, but also as a service unit to the classrooms.

In this fashion the shop offers an extended version of the home workshop where the resources are assembled to do the job required in the course of the work of the class. Portable shop units that can be brought into classrooms to do necessary work have much to offer.

Arts and Crafts

The junior high school years are crucial in the development and use of artistic talent. The increasing self-consciousness of the students needs to be overcome lest art skills cease to be one way of expression. The great talent of students shines in junior high schools where a good art program flourishes.

The art program has widened as an element enriching the resources of the school. The new San Francisco junior high schools have art suites that include many types of activities and are specifically planned for both school and community use.

Student-Directed Activities

Early adolescence is an awkward age. A good junior high school will arrange many activities that will help students to learn to get along with others. Of primary importance in this endeavor are the informal student-directed activities such as clubs, interest groups, student self-government, class activities, etc.

An art room suite for junior high schools. This is composed of the main art room, a clay area, an art activity room and general storage areas. Storage cabinets also line the walls of the room.

Increasingly, space is being provided in the junior high school plant for headquarters for some of the student-directed activities. Meeting rooms, offices and, particularly, storage space are important. Clubs and interest groups will use classrooms, shops or other educational spaces around the building. Self-government, publications and student enterprises will flourish best if space is provided in which they can take root.

Overbuild this area of a new junior high school, for the variety of activities is so great and the return from this use of student time so important, that there cannot be too much space. Yet, there are few schools which provide any space at all for student-directed activities.

Spaces for informal social activities will be provided by many means. Lobbies will be used, rooms developed for this purpose, living rooms of homemaking suites, parts of libraries and cafeterias so used, so that students may learn how to get along with their fellow students—probably the most important vocational asset an adult can have.

Records and Guidance Center

One of the basic justifications of a junior high school is its role as a guidance device. A junior high school building is characterized by the attention devoted to guidance in its administrative spaces and the degree to which student records are collected, centralized and made available for appropriate use by the staff.

Use of Equipment Lists in Planning

No single factor directly reflects the functions of a space more than the equipment that is to be located and used in the room. This is particularly important in the junior high school because of the desire of the school to expose the student to as many facets of our culture as possible. One of the major steps in the early phases of planning is to develop, with staff cooperation, an intensive description of the equipment to be used in each space in the building.

> Each teaching group should be encouraged to develop its own brochure in which would be catalogued and illustrated the types of furniture wanted. The educational and material reasons for the selection should be given.
>
> The planners of a school building would derive untold advantage from such a series of brochures or scrapbooks. The aims of each subject area would become apparent. The area layouts could be made from the beginning with equipment space requirements in mind, and the chances of omission of items would be reduced to the minimum. All this work would give added assurance that the building would be planned to meet the educational needs for which the project was initiated.[2]

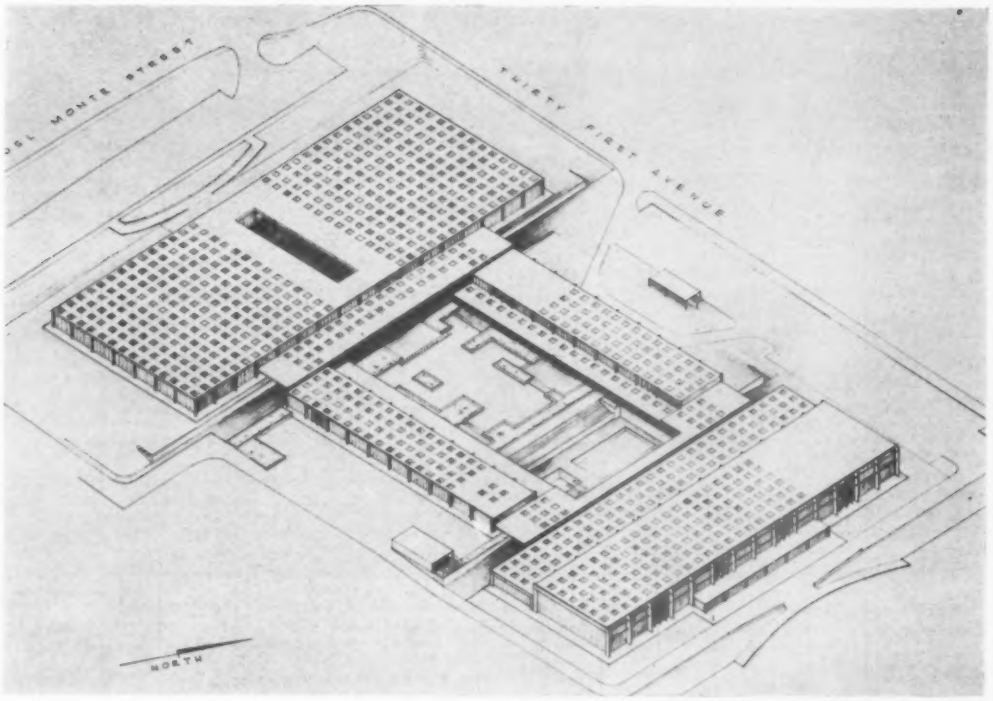
Characteristics of a Junior High School

The characteristics of a junior high school are reflected in the plans for its facilities:

1. It is *not* a senior high school with younger children.
2. It has an abundant variety of offerings which allows students to enjoy and explore many areas of activity.
3. The importance of learning to get along with others is emphasized in this period of early adolescence.
4. It offers increasing opportunity for independence of the student, under the general guidance of the school.
5. It utilizes the great interest and enthusiasm of students of this age.
6. It offers ample physical activities. Children are at their most active stage during the junior high school years.
7. It offers a wide variety of extramural activities, clubs, social activities and student-managed enterprises.
8. It offers a close and sympathetic system of guidance for all students. In many cases this has gone beyond the use of homeroom periods and guidance personnel and has resulted in the assignment of children to one teacher for several subjects or for a considerable block of the school day. This is designed to promote an easier transition from the elementary school classrooms to the senior high school program and, above all, to make for a more meaningful educational experience in the junior high school.

The cry is for junior high school buildings planned for junior high school use. Much remains to be done. One of the greatest incentives to do a better job in this field is to mingle more often with students of junior high school age. They are at such a wonderful time of life they cannot help but inspire all of us.

[2] Engelhardt, Engelhardt and Leggett. *The Junior High School, Its Furniture and Equipment.* The authors, 551 Fifth Avenue, New York City, 1952. p. 7.



Hillsdale High School, San Mateo, California, John Lyon Reid, architect of the building. Building is on three levels to accommodate the site.

A HIGH SCHOOL THAT WANTS TO STAY YOUNG



by JOHN LYON REID

AIA, Architect, San Francisco, California

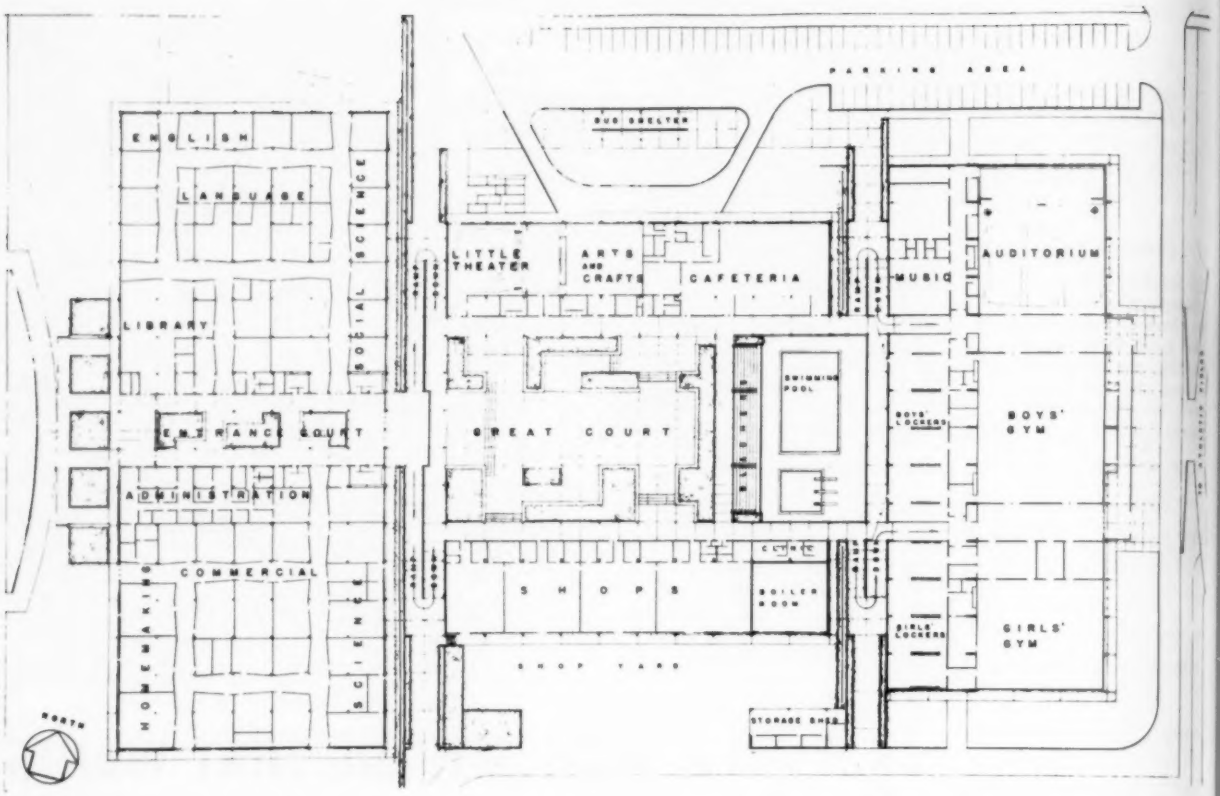
A native of Seattle, Washington, John Lyon Reid's experience in schoolhouse design covers more than a quarter of a century. His designs for the Deer Park and Manor Elementary Schools, Fairfax, California, have won him a top award in the 1953 Competition for Better School Design sponsored by *The School Executive*.

THE governing board of San Mateo Union High School District decided to build its newest secondary school, Hillsdale High School, as a complete school plant in a single construction program. This decision made it possible to develop unique design features to fulfill the requirements, both stated and implied, in the district's educational program.

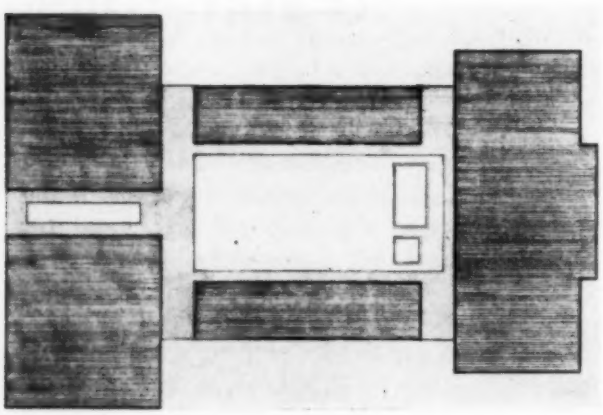
Why such a decision? Population growth in the school district has not only been rapid, it has been spectacular. The enrollment of high school students was 2,462 in 1945 and increased to 3,363 in 1952. Carefully studied predictions show that in 1962 the enrollment will be 8,224 with the prospect of more growth to come. There are now three high school plants serving the district; Hillsdale High School will become the fourth school plant. In the face of this rapid growth, the decision to build a complete high school means that the district will just keep abreast of its needs.

The San Mateo Union High School District includes within its boundaries five cities, towns and communities: San Mateo City, Burlingame, Millbrae, San Bruno and Hillsborough. The school district is located about twenty miles south of San Francisco and, since these suburban areas are commuter centers, their growth has been rapid; and, too, local industries, businesses and services have grown correspondingly.

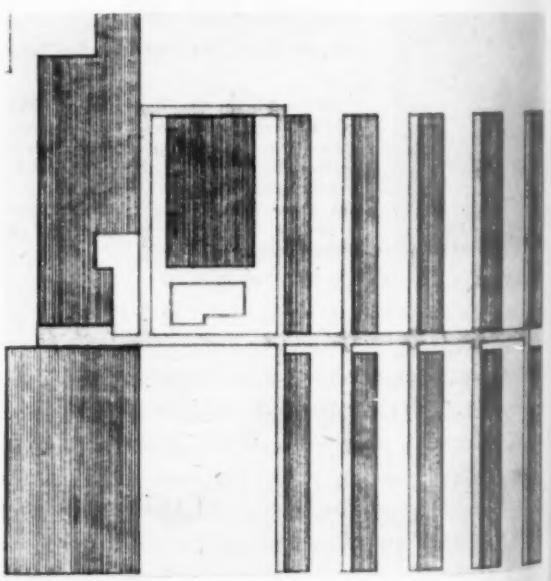
What about the educational program? This was formulated by the teaching staff of the district under the leadership of Superintendent Thomas F. Reynolds with the participation of collaborators and consultants: the office of School Planning of the State Department of



Floor plan of Hillsdale High School. Academic area is at the left, gymnasiums and auditorium are at the right. Shops and the boiler room flank one side of the great court.



The Hillsdale plan. Dark areas are the building spaces, lighter areas are enclosed corridors.

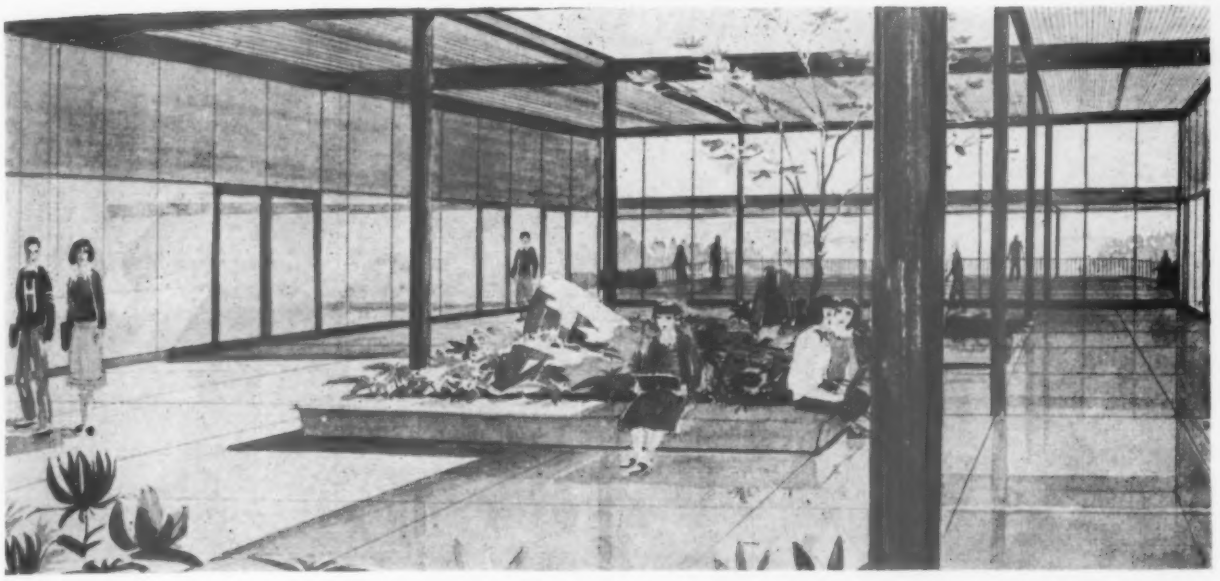


Finger plan for the same facilities provided by the Hillsdale plan. This arrangement is less compact, requires greater corridor area and takes up more of the available site.

Education under Dr. Charles W. Bursch, the Office of the County Superintendent of Schools, represented by Mr. Al Glantz and the educational consultants of the School of Education, Stanford University, Drs. James D. MacConnell and William R. Odell, each of whom made contributions of significance. This panel created the educational program from which the form of the Hillsdale High School was designed.

Determining Educational Program

The educational program was first a tabulation of teaching spaces with a description of the facilities and equipment needed to implement the learning activity, all based on the program now carried on in the district. However, the useful life of Hillsdale High School (or any school building) may be expected to extend for an indefinite time into the future. Its prime of life may occur in 1985 or 1990, when it must expect to



View of the entrance court, facing east. The four building areas surround the court and provide protection to the court from the prevailing winds.

render as effective an educational service as it will in 1954. This school plant, then, must be responsive to today's requirements and equally so to the unpredictable demands of the program 35 years hence.

Teachers not only were explicit about teaching spaces and equipment, but were quick to explain teaching methods and objectives (equally useful to the architect). They were further concerned with having a building which would be adaptable to meet future requirements. Partitions must be easily movable. The conversion of floor areas into large size rooms of any required shape and dimension must be as easy as conversion into smaller rooms and offices. Daylighting must not present problems when rooms of unusual size or shape were required. Teachers had experienced the difficulties of adapting a learning program to the limitations of conventional and inflexible space and they wanted a plant that could accommodate itself to program changes. During the programming stage this was a hope more than a demand.

Planning for Flexibility

Discussion of the program by the teachers led to formulation of the first requirement of the new school: flexibility. The decision to build the entire plant in one construction program made it feasible to consider large loft spaces as an answer to the problem of flexibility. This would not have been possible were the school built in small increments over a period of years. The loft space approach promised a building area in condensed form which would conserve site space and offered hope for economy in reduced perimeter of outside walls, shorter runs of utility lines and shortened corridors. Loft space also permits maximum freedom for arranging room spaces without limitations imposed by window walls and the comparatively narrower dimensions of conventional building wings.

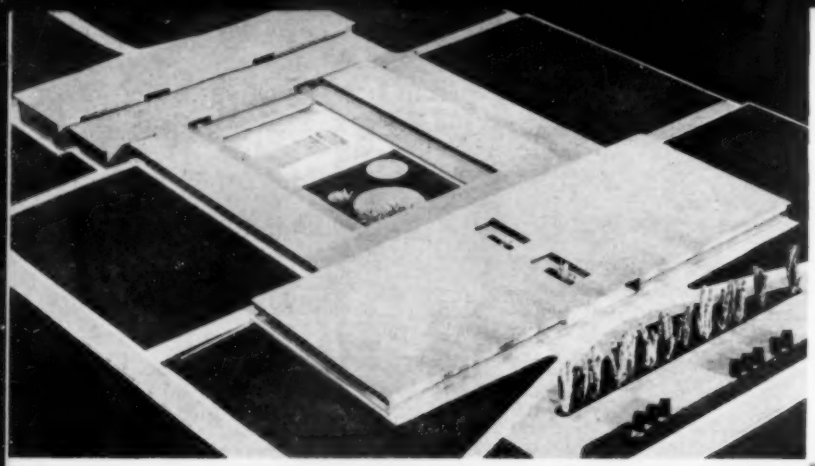
A building in the form of a loft space of large dimensions presents problems in design among which the most important are lighting, heating and ventilation. Much of the floor area is located too far from the outside walls to rely on windows for light and ventilation.

In Hillsdale we decided to provide daylighting through the roof by means of square panels of glass block installed in the approximate plane of the roof; they are each 6 feet square and are placed 14 feet apart center to center in both directions. This system of toplighting throws light into all areas except the little theatre and auditorium. Toplighting provides an even, well distributed lighting pattern over the entire floor area.

Excessive heat gain, usually associated with skylights as a source of toplight, has been avoided by a specification calling for a glass block designed to reject the direct rays of the sun, and with this rejection much of the heat gain is avoided. The spacing of 14 feet was chosen for the toplight panels so that floor areas may be divided into small or large rooms, with a resulting uniformity of daylighting.

Heating and Ventilation

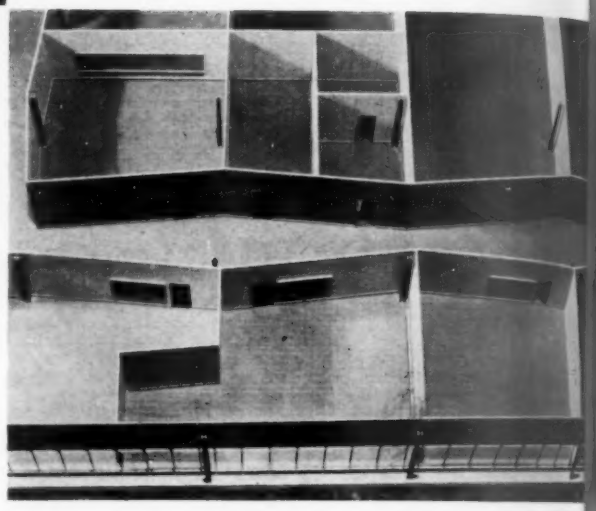
Heat and ventilation are provided by an overhead double duct forced air system; one duct carries hot air, the other outside air. These are mixed as required to furnish the desired temperature. The ventilation system is closely related to the toplight panels. There are four supply outlets, one at each corner of each toplight panel and one exhaust outlet per toplight panel. The large numbers of ventilation outlets and their



Small scale model of the building, showing the academic area in the right foreground, gymnasiums at far end of court and shops on far side of the court.

close spacing (7 feet center to center in both directions) are to permit the floor area to be subdivided into small rooms and offices, as well as into large classrooms and laboratories, with a balanced ventilation system independent of room size or shape. The temperature of each 28-foot square floor bay (784 square feet) is controlled by one thermostat.

In order to test the predicted performances of this design in both ventilation and lighting, full size mock-ups of two classrooms were constructed. One was built in the daylighting laboratory of the Department of Physics at the University of Michigan under the direction of Dr. R. A. Boyd; the Kimble Glass Company, manufacturers of glass block toplights, cooperated in this venture. The objective of this full size classroom model was to verify daylighting design data. The lighting intensity of the model was even and approximated 75 foot-candles with a maximum brightness contrast of 10 to 1. Fluorescent fixtures of low brightness with glass lenses were selected for artificial light, and are closely related in ceiling pattern to the toplight panel. Fixtures are placed around the perimeter of each panel to form a square.



Same model as above with the roof removed. A typical classroom is 28 by 28 feet. All partitions are removable. Commercial and science rooms are 28 by 42 feet.

Thermal Laboratory Findings

The other full size classroom was constructed at the thermal laboratory of Barber-Coleman, Inc., at Rockford, Illinois. Here the purpose of the model was to test the performance of the ventilation design and to study the circulation paths of air, speed of air currents and the acoustics of the system. The model offered verification of the fact that a minimum of eight air changes per hour could be provided with no noticeable drafts or noise. Such a system insures that all rooms will have a positive, filtered supply of air at all times and will not depend on a teacher's remembering to open a window. The shop and cafeteria wings are heated by ceiling-mounted unit ventilators, and the physical education and auditorium portions by a duct system with register outlets. In the latter the location of controls and outlets differs from the system used in academic areas of the building since use requirements are so different.

The structural system used for this school is a steel frame resting on concrete footings with a con-

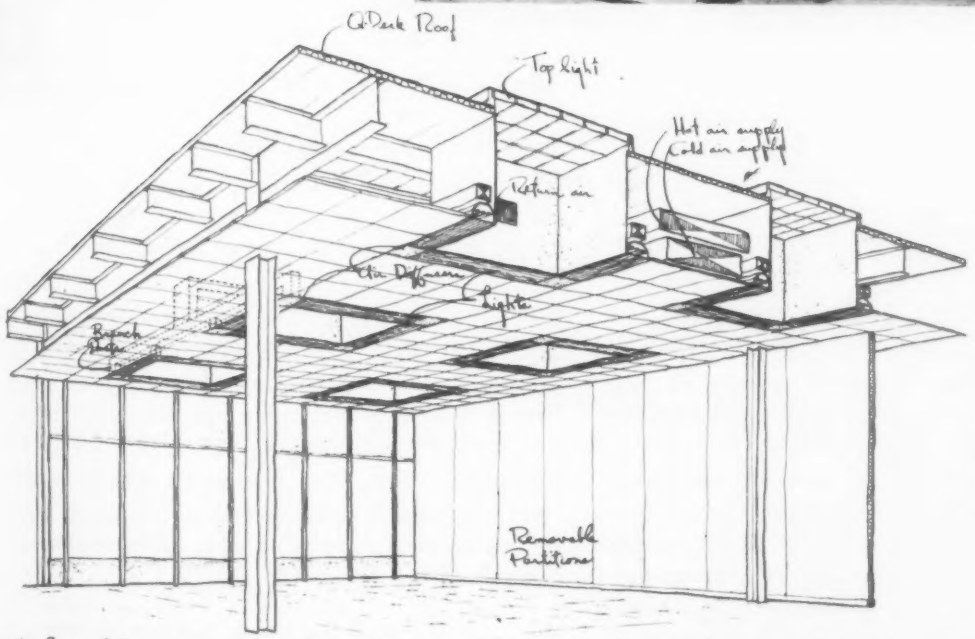


Daylighting is provided through the roof by means of square panels of glass block which is designed to reject the direct rays of the sun to avoid heat gain.



Hedrich-Blessing

Full-size mock-up of a Hillsdale classroom was constructed at the University of Michigan daylighting laboratory under the direction of Dr. R. A. Boyd. This was done to verify daylighting design data.



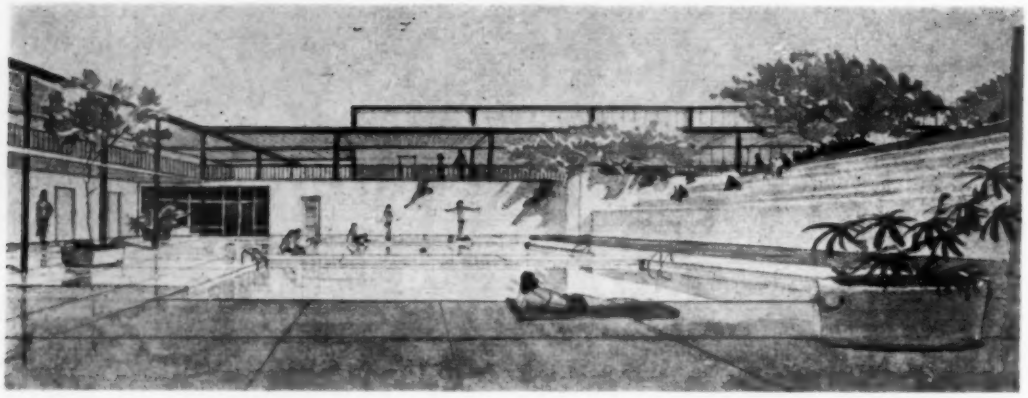
Heating and ventilating arrangement. The balanced ventilation system is independent of room size or shape.

crete floor slab on grade. In the academic area steel columns are spaced 28 feet in both directions, supporting a system of steel beams and purlins with a steel roof deck. For the shop, cafeteria and physical education wings structural materials are the same except that the space is spanned by a series of steel rigid frames 28 feet center to center. In the latter wings ceiling structure is exposed, but in the academic areas there is a suspended ceiling which covers the structure, the ventilation ducts and all utilities.

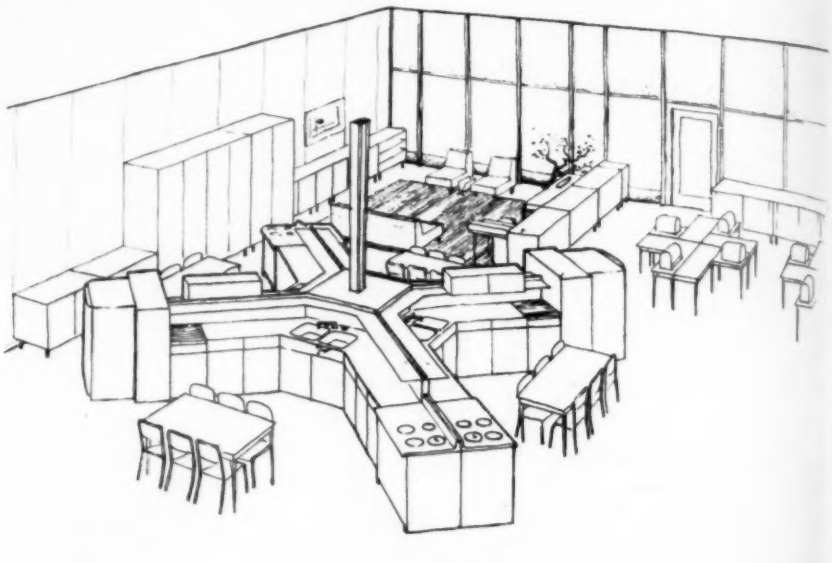
Heights of Ceilings

There is a distance of approximately 4 feet between ceiling and roof in the academic area. This is the depth required by the structure and ducts and produces a shallow light well at each toplight panel. Ceiling height of the academic section is 12 feet, increasing to 16 feet in the cafeteria, little theatre and shop areas, and again to 26 feet in the physical education-auditorium wing.

Partitions throughout the academic area are metal units which offer minimum resistance to demounting and reassembling when changing room shapes and sizes. Corridor partitions are splayed, not parallel, to reduce corridor noise. Flooring is asphalt tile. All cabinet work is movable and should be considered as furniture rather than conventional millwork. Exterior walls consist of a grid of aluminum structural



Swimming pool of the Hillsdale High School. Locker rooms of the physical education program are available during the summer months to pool users.



Homemaking suite at the right consists of a living and dining room, unit kitchens and a multi-purpose area.

shapes which hold insulated metal panels where a solid wall is wanted or tinted glass where windows are needed. The supporting aluminum gridwork is such that exterior doors and windows can be rearranged almost as easily as interior partitions.

Since windows are used for view only and not as a source of light, a grey tinted glass was selected which has a light transmission factor of 26 percent. This filters sunlight and reduces its brightness to such an extent that one can read in comfort with sunlight from the windows falling directly onto a printed page. Sun controls for the windows have not been found necessary.

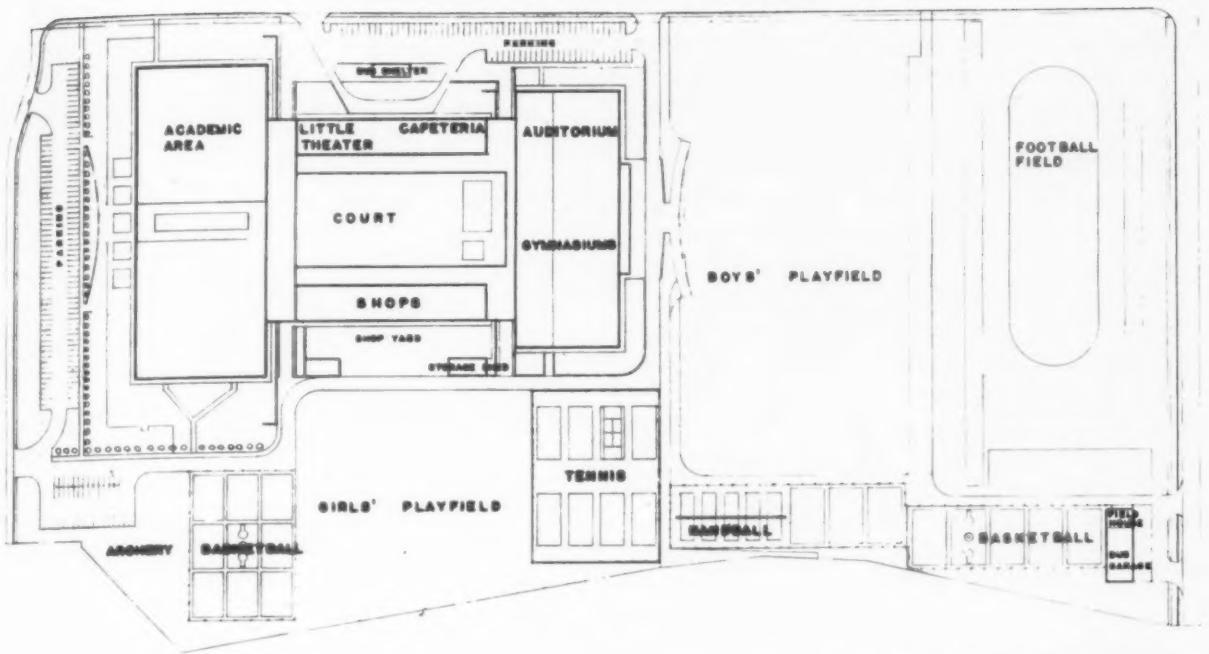
There are cost economies inherent in this design which are not readily apparent. First, there is the economy of space. In the Hillsdale High School there are 123 square feet per pupil for the complete plant, including auditorium and all corridors. Most of this is teaching space. Without the auditorium the per pupil area is 117 square feet.

The overall design offers economies in construction scheduling for the builder. In the academic areas the repetition of identical structural bays will speed erection; ventilation and lighting units are repetitive and can be installed before partitions go in; ducts are all straight runs. Large areas of asphalt floor tile and acoustical ceiling tile can be installed speedily without cutting around partitions or cabinet work. The condensed area of the building shortens the run of utilities and corridors. The more costly outside perimeter walls are reduced in length and replaced in large part by less expensive partitions. This reduces weather exposure and heat losses.

Fire Resistive Quality

It is true, however, that large floor areas covered by a single roof require a higher type of fire resistive construction than smaller units of buildings, but the cost of this construction does not invalidate the economies listed above.

The design features of the building have resulted in new techniques in daylighting, heating, ventilating and partition flexibility. From these have come a new freedom in planning. However, room relationships, the pattern of circulation, community use provisions, parking and bus loading arrangements and the relation of outdoor areas and athletic fields to the buildings are the same as those found in any well



There is enough room for all outdoor game areas on the site of Hillsdale High School. Ample parking spaces are also provided.

planned high school, and their planning is based upon universally accepted principles of good school design.

Site of the Building

The building site is slightly more than 33 acres. While reasonably adequate this site size requires careful use of the land to provide for all of the roofed and outdoor teaching spaces. The site is in an area which is windy during much of the year. At times the winds are such that exposed corridors are a disadvantage. Wind protection at all times is desirable. The enrollment capacity of this school was fixed at 1,750 students and full occupancy is expected almost at the completion of the construction. In a student group of this size the spread of the buildings in an open finger plan not only would have necessitated excessive travel distances but would have used up site area needed for outdoor athletics.

The academic portion consists of two large building areas joined by an open court for circulation of

Hillsdale High School
San Mateo Union High School District
Cost Summary

Building Unit	Area	Unit Cost	Cost
Academic Area	96,656 sq. ft. @	$15.37/sq. ft.	$1,485,633
Shops and Boiler Room	28,644 sq. ft. @	12.22/sq. ft.	349,992
Cafeteria and Little Theatre	25,284 sq. ft. @	12.92/sq. ft.	326,804
Gymnasium Area	48,892 sq. ft. @	15.20/sq. ft.	743,302
Music Department	5,488 sq. ft. @	17.00/sq. ft.	93,296
Sub Total	204,964 sq. ft. @	$14.63/sq. ft.	$2,999,027
Auditorium	10,976 sq. ft. @	19.94/sq. ft.	218,898
Sub Total	215,940 sq. ft. @	$14.90/sq. ft.	$3,217,925
Swimming Pool			75,000
Sub Total			$3,292,925
Site work: including grading, athletic field preparation, parking, basic service roads, basic landscaping			130,000
TOTAL			$3,422,925
Work not included in above estimate:			
Bus Garage	4,000 sq. ft. @	$ 7.50/sq. ft.	$ 30,000
Field House	2,000 sq. ft. @	10.00/sq. ft.	20,000
Additional Landscaping			20,000
Additional Service Roads			20,000
Football Field Lighting			45,000
Other Field Lighting			25,000
Well Water System			70,000

traffic. One academic area contains administrative offices, science, mathematics, commercial and homemaking departments; the other academic area, which is equal in size, houses the library, art, mechanical drawing, English, language and social studies departments. Administrative offices and the library are located so that they are directly accessible from the outside.

It is in these academic areas that the greatest degree of room arrangement flexibility has been provided. It is here that the prospect of rearrangement of partitions is greatest. Shops, cafeteria, crafts area, auditorium and physical education units have reduced provisions for flexibility consistent with their present use and anticipated conversions. It is not contemplated that auditorium and gymnasium will need to be converted to a totally different use, such as classrooms, hence that degree of flexibility is not provided.

The auditorium and physical education wing are joined to the academic portion by two parallel building wings—one contains the shops, with shop yards and related utility sheds to the south; the other houses the cafeteria, little theatre and crafts room. The cafeteria and little theatre are located and arranged so that they are directly accessible from the outside. The auditorium seats 1,000 and has a separate entrance. Adjacent to the auditorium platform is the music department which is designed so that the auditorium platform serves the music department as a related teaching area. The boys' gymnasium is designed for spectator sports, has a separate entrance and contains folding bleachers to seat 1,400. Locker rooms, in addition to normal uses of the physical education program during the school year, may also serve the summer users of the swimming pool, even though the remainder of the school may be closed.

Outdoor Areas

The four major building areas surround an open air court and afford protection to the court from the prevailing winds. This open area will be given constant use by students for outdoor lunches, for assembly and for lounging; the swimming pool is at the east end of this outdoor court but is separated by a difference in ground level, being 12 feet lower. Spectator bleachers for the pool are located on the earth bank between the two levels.

The site is large enough so that by careful planning there is enough room for all outdoor game areas. The football field and track with spectator bleachers are at the eastern extremity of the site. There are paved game courts south of the physical education building which separate the boys' and girls' playfields but which are used by both boys and girls. Arranged around the buildings are parking areas for almost 250 cars.

Locating Buildings on the Site

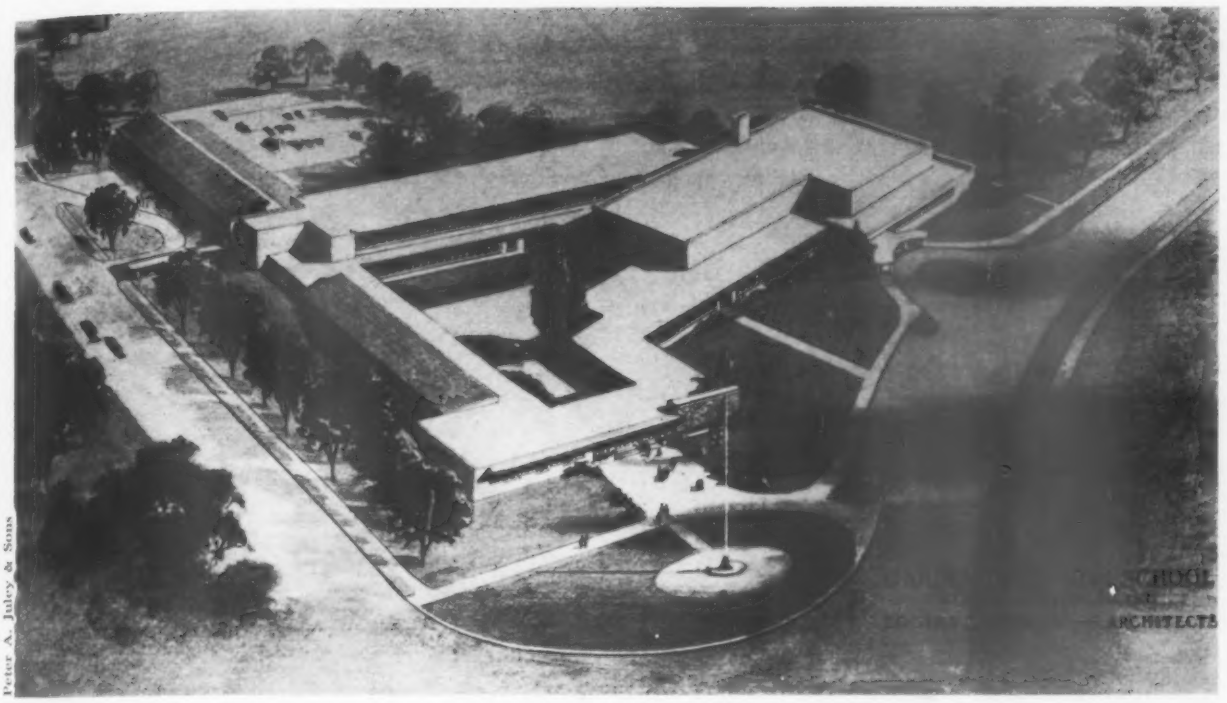
The site slopes approximately 70 feet in vertical elevation from a high point in the west to a relatively level section at the east. That was an important consideration in locating the buildings on the western portion of the site in order to leave the flatter areas for athletic fields. The floors of the building generally drop with the site. The building unit requiring the greatest ceiling height is at the low portion of the site so that roofs of all wings constitute virtually a single plane. There are no stairs in the entire plant; ramps are used throughout.

The Hillsdale High School is located in a residential area and most of the streets will always be of residential character; the Alameda de las Pulgas to the east will probably carry heavier traffic in the future. To avoid proximity to this traffic was another reason for placing the buildings on the western area of the site away from the Alameda.

Major participants in the design program for Hillsdale High School are as follows:

District Superintendent—Thomas F. Reynolds
Educational Consultants—Dr. James D. MacConnell, Dr. William R. Odell
Mechanical Engineer—G. M. Richards
Landscape Architects—Eckbo, Royston & Williams
Acoustical Engineer—Daniel Fitzroy
Architect—John Lyon Reid, A.I.A.

Construction began on the first of January, 1954, and completion of the entire project is expected by December, 1954.



Peter A. Juley & Sons

New Garden City, Long Island, High School. Eggers and Higgins, architects.

A SECONDARY SCHOOL FOR GARDEN CITY



by R. JACKSON SMITH

Eggers and Higgins, Architects, New York City

Mr. Smith has been an associate in the firm of Eggers and Higgins since 1951. He has been with the firm since 1939. He has a B.A. degree from Dartmouth College and a B.Arch. from Yale University. Mr. Smith received eight decorations and ribbons for his World War II service as a U.S. Naval Reserve officer.

and McDONALD F. EGDORF

Superintendent of Schools, Garden City, New York

Superintendent Egdorf has a B.S. degree from the Maryville, Missouri, State Teachers College, and an M.A. from the University of Illinois. Prior to his position in Garden City, he served as principal of high schools in Illinois.

A SUCCESSFUL secondary school building invariably results from close cooperation among school board, superintendent, architect, faculty and community. From the first meeting to the last pencil line on the final plans, Eggers and Higgins, architects for the Garden City High School, were able to draw upon the conscientious efforts of an able Board of Education, an imaginative administrator, intelligent faculty and a highly literate and visionary community.

Garden City, a favored suburban residential village and publishing center, is located in Nassau County, Long Island, about 18 miles from New York City. Although one of the first planned residential communities in the United States, it has no public library, no community center and no community recreational program or facilities. A citizens' committee, sponsored by the Board of Education, conducted an educational survey to establish the future development of the secondary school program. Included in this report was an analysis of sites, population trends, future enrollments, school plants and school programs. This material formed the backbone of the program of requirements presented to the architects.

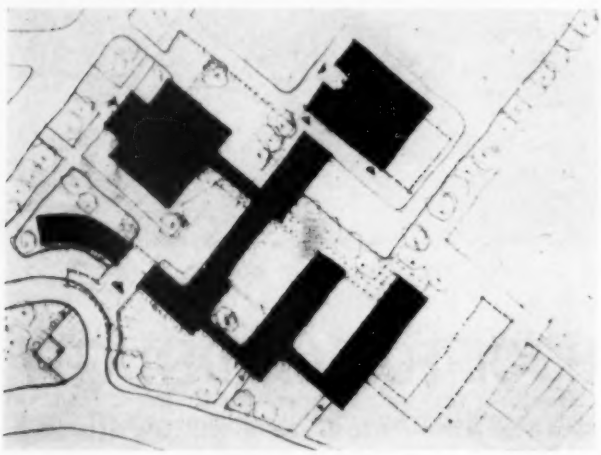
The architects' assignment was to design a group of related operational units for 900 pupils, expandable to 1,200 pupils and including community accommodations, on a 27-acre site previously acquired by the Board of Education. The final design achieves a small school atmosphere and creates a garden effect in keeping with the character and appearance of the village. In view of the fact that more than 80 percent of Garden City High School graduates matriculate to college, the educational program requirements are extensive.

The architects considered this project fundamentally

as a plan problem, with the architectural effect of the structure to evolve from the plan. In the preliminary planning of the project ten possible plan schemes were developed (Schemes "A" through "J"). Each was evaluated on its merits to fulfill the program requirements, to meet the high design standards set for the project and to fit well on the site.

Site Restricts Scheme A

The initial study (Scheme "A") reflected a general desire that the plan be a college campus arrangement of seven units. While this scheme showed considerable merit and imagination, it became evident that the odd-shaped site imposed restrictions for a complete campus plan and that efficient site utilization was to become a major design challange. The possibility of a multi-story building was then investigated but it was felt that any economies realized thereby would be offset by loss of the highly desired garden residential atmosphere. The remaining studies were devoted to refinements of the modified garden campus arrangement.



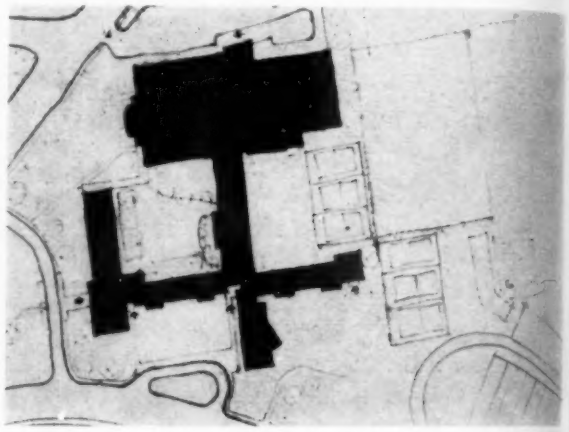
Scheme A of the proposed high school. Ten schemes were prepared before the final design of Garden City High School was chosen.

The final scheme, incorporating the advantages of the campus school, was a free-plan relation of individual units tied together under one roof. The plan provides open ends for expansion and reflects in its final shape conditions dictated by the site and the program. The building, essentially a one story structure with a second story section devoted to science laboratories and fine arts, incorporates three main divisions.

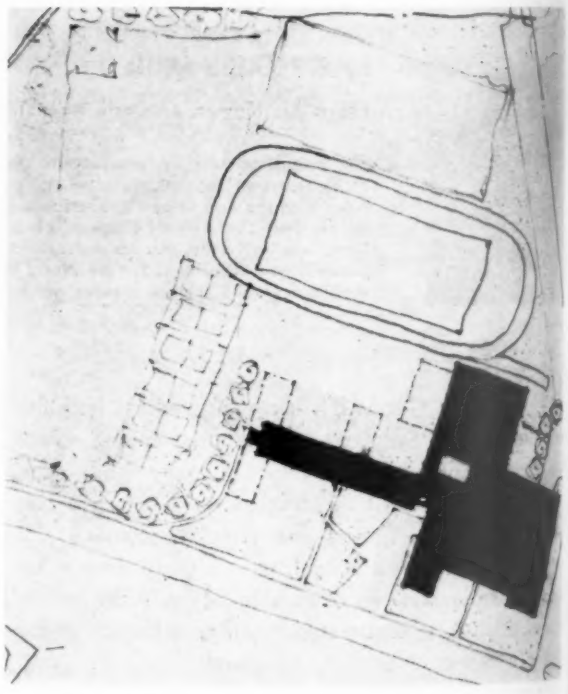
The Students' Division

The students' division includes academic and special classrooms, a bus loading platform at the students' entrance, and a spacious lobby which doubles as an exhibition area and circulation center for the academic units. For flexible use and programming there are 28 general classrooms of three different sizes: 24 feet by 24 feet, 24 feet by 30 feet and 30 feet by 30 feet. Roof overhangs and canopies reduce glare and control sunlight. Clerestory bi-lateral lighting is provided in the large square classrooms. Corridors borrow light from wire glass openings over the lockers. This feature reduces the tunnelling effect common to many school corridors.

The school library will have a main reading room for 125 students and will house 17,000 volumes. One

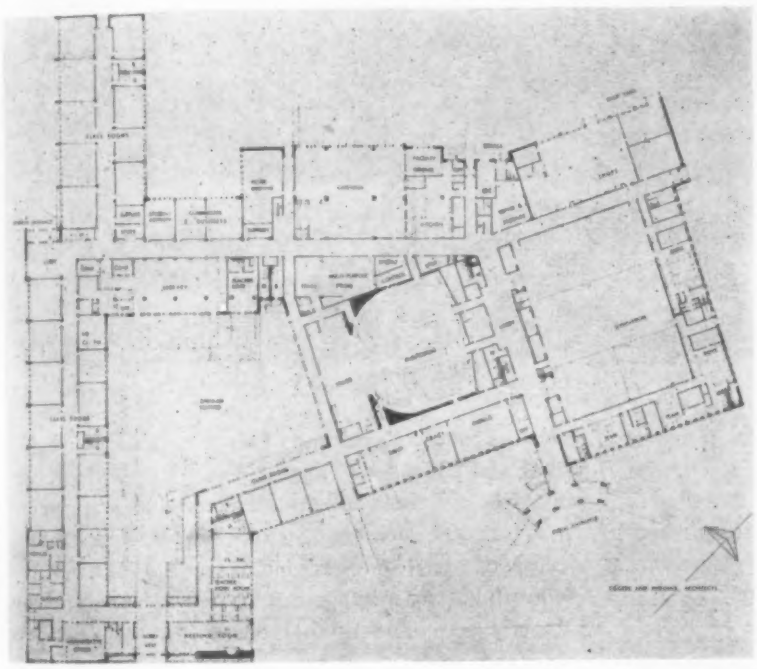


Schemes E and G were among those rejected as the design solution for Garden City High School's educational program. Final scheme is essentially one-story.

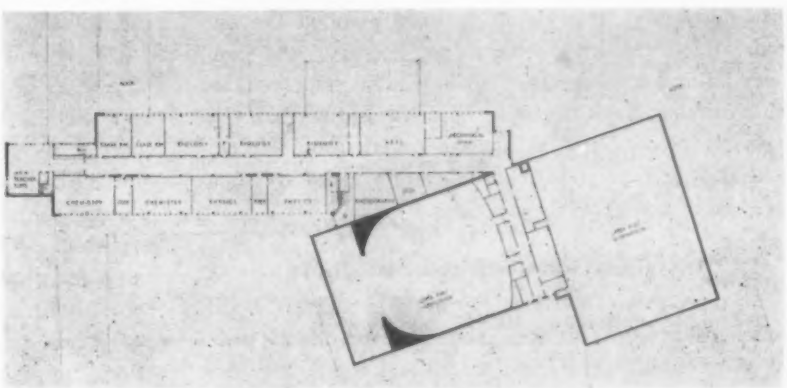


side will open on a terrace overlooking the garden. The cafeteria will have a similar terrace and will provide seating arrangements for 400 students at one time. The cafeteria provides ample space for school and community dances, thus preserving the gym playing surface, to the delight of the athletic staff. The homemaking department will be adjacent to the cafeteria.

An important feature of the Garden City school program, the fine arts department will have one studio for art and one for mechanical drawing, both located on the second floor. A fully-equipped photographic laboratory completes this department. Other features include classrooms for speech and dramatics, typing and general commercial work, industrial art workshops and individual laboratory study booths in the biology, chemistry and physics department. The high academic standards of the Garden City High School have produced a keen and active interest in the science program which explains the unusual number of science laboratory and lecture rooms.



Main floor plan of the Garden City High School. Center court has provisions for open-air seating. Large units at the right are the cafeteria, shops, auditorium and gymnasium. Administrative offices are at the lower left.



Second floor plan of the high school. On this level are located the science, arts, mechanical drawing and photography areas. Upper portions of the auditorium and gymnasium are at right.

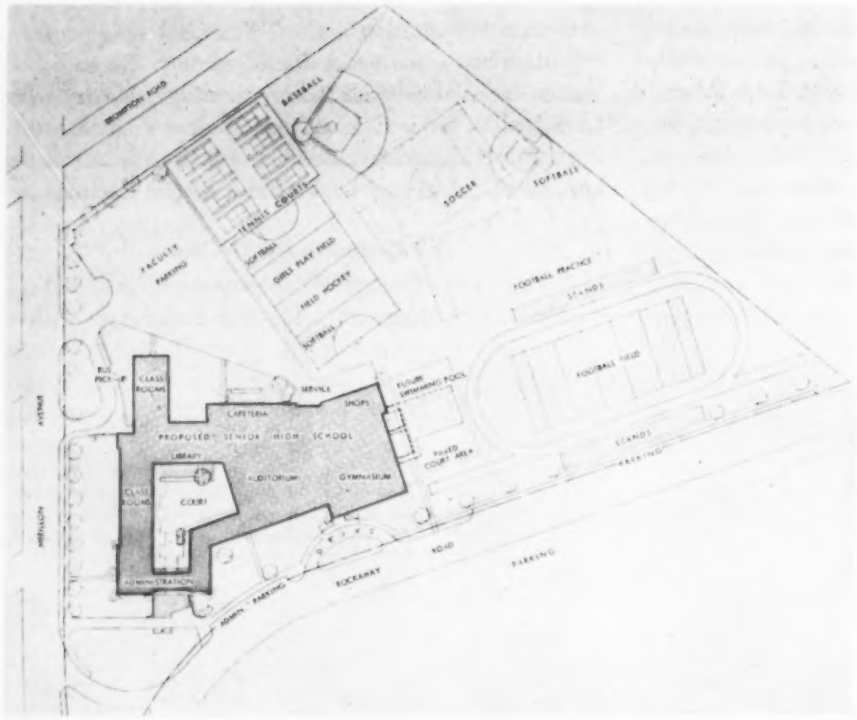
The administration division has an independent yet centrally located administration department which was one of the keys to the final analysis of the plan. This unit contains the main public entrance to the building and to the inner garden court. It permits visitors to meet administrative personnel without interference with the academic program or the students.

Located in this unit is a lounge or meeting room, an interesting addition to the high school building, contributing home-like space for community functions as well as for students and faculty meetings. This room is furnished to serve civic groups, student council meetings, P.T.A., faculty meetings, guidance conferences and, on occasion, may be used as a special classroom.

The Community Division

This unit, located directly opposite an 800-car parking lot, features an 1,100-seat auditorium with a large stage. A music department is immediately adjacent with facilities for band, chorus, individual and group instruction and practice. A multi-purpose speech and drama studio and control room adjoins the auditorium for radio and television broadcasting and recording.

As many as 1,500 spectators will be able to witness varsity basketball games in the spacious new gymnasium. It will be divided by folding partitions to provide three or four separate physical education areas for boys and girls. A third practice gym will be available for gen-



Site plan reveals the full utilization of the area by the building, athletic fields and parking spaces. There is also room for a future swimming pool. Size of the site is 27 acres.

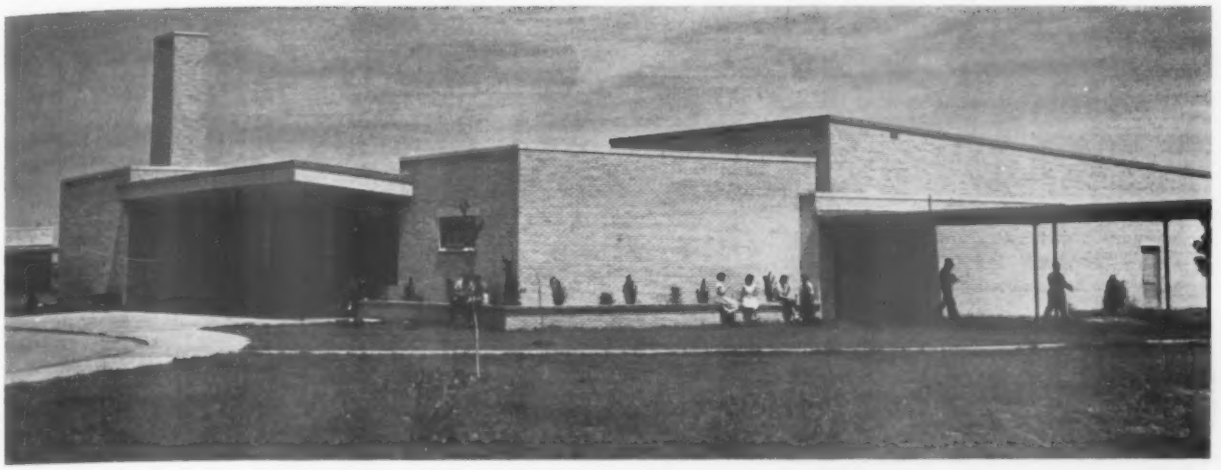
eral physical education programs. Seven hundred spectators can witness afternoon contests and still permit the girls to have a separate gymnasium. Other gym facilities include physical education lockers, team rooms, trainer room, equipment and equipment drying rooms, shower rooms and staff offices.

Provision has been made for a 75-foot by 42-foot enclosed swimming pool as a future school and community possibility. The architects have planned the outdoor athletic facilities within easy access to the gymnasiums and lockers. They include a football gridiron with running track, separate baseball and softball diamonds, a soccer field, a football practice and lacrosse field and girls' playing fields. Spectator areas are separated from the general play areas.

Divisions Surround Garden Court

These three divisions surround a garden court, which, aside from enhancing the structure, offers a number of possibilities for both school and community use, such as outdoor reading, painting exhibits, meeting areas and relaxation. The area has a hard surfaced portion that will hold a portable stage and seat approximately 1,000, providing for concerts, dramatics, dances, ice skating and outdoor commencement exercises. The industrial arts department, practically a unit by itself, is directly accessible to the students or the public, yet separated from the academic and other areas where excessive noise would present a problem.

The units of the structure were zoned for control of after-hour activities and to meet mechanical problems both before and after expansion. Future utility services were planned in advance and incorporated in the initial structure. Special facilities in the original plans, such as cafeteria, kitchen, library, auditorium, gymnasium and lockers, have been planned for a maximum enrollment of 1,200 pupils. The building is designed with a contemporary approach to fit into a village whose garden community tradition has been maintained through almost one hundred years.



Main and side entrances to the academic unit of the Hobbs Secondary School, Vorhees, Standhardt and Swatek, architects. The student center is reached by the main entrance, and the air-conditioned little theatre is located behind the covered walkway.

HOBBS, NEW MEXICO, PLANS A SECONDARY SCHOOL

by **CHARLES L. MILLS**

Superintendent, Hobbs Municipal Schools, Hobbs, New Mexico



Charles Mills received his bachelor's degree from Highlands University, Las Vegas, New Mexico, and his master's from the University of New Mexico. He has held administrative posts in the Hobbs Municipal Schools since 1935. Mr. Mills' primary interest is to involve school and lay people in developing and supporting a public school program to meet the needs of boys and girls and to provide facilities conducive to good teaching and learning.

and **FRANK M. STANDHARDT**

AIA, Vorhees, Standhardt and Swatek, Roswell, New Mexico



Frank Standhardt received his education at the University of New Mexico and Texas Technological College at Lubbock. He is chairman of the Planning and Zoning Commission of Roswell, N. M., and a member of the Board of Examiners for Architects in New Mexico. His principal interest is informing the public of the need for design and planning in solving community problems, and in the application of good design thereto.

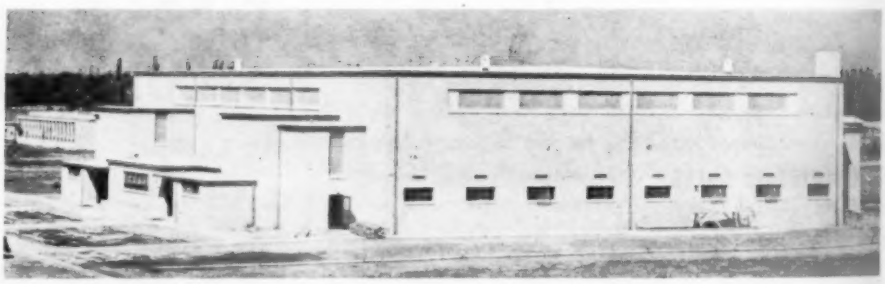
GOOD schools don't just happen—they become so only when school and lay people believe in good schools to the extent that they work for and support them. Furthermore, the effort people in any community will make to build and support good schools depends on the degree to which everyone concerned is involved in knowing and informing others about the program and needs of their schools; in identifying school needs; and in determining a community action program to solve these needs.

This policy of including all concerned in the solving of school problems is getting splendid results in Hobbs, New Mexico. Local production and use of wall charts and filmstrips, talks to community groups, conferences with community leaders, radio programs and newspaper articles, and public distribution of illustrated information, brochures and pamphlets were used throughout the planning of the new high school. Perhaps the rule of thumb practice of always giving credit where credit is due for ideas used and of keeping people posted, especially all school people, on progress being made contributed more to the successful planning of Hobbs' new community centered high school than any other single practice.

Growth from a one-room rural school to a 200-classroom municipal school system in less than 25 years



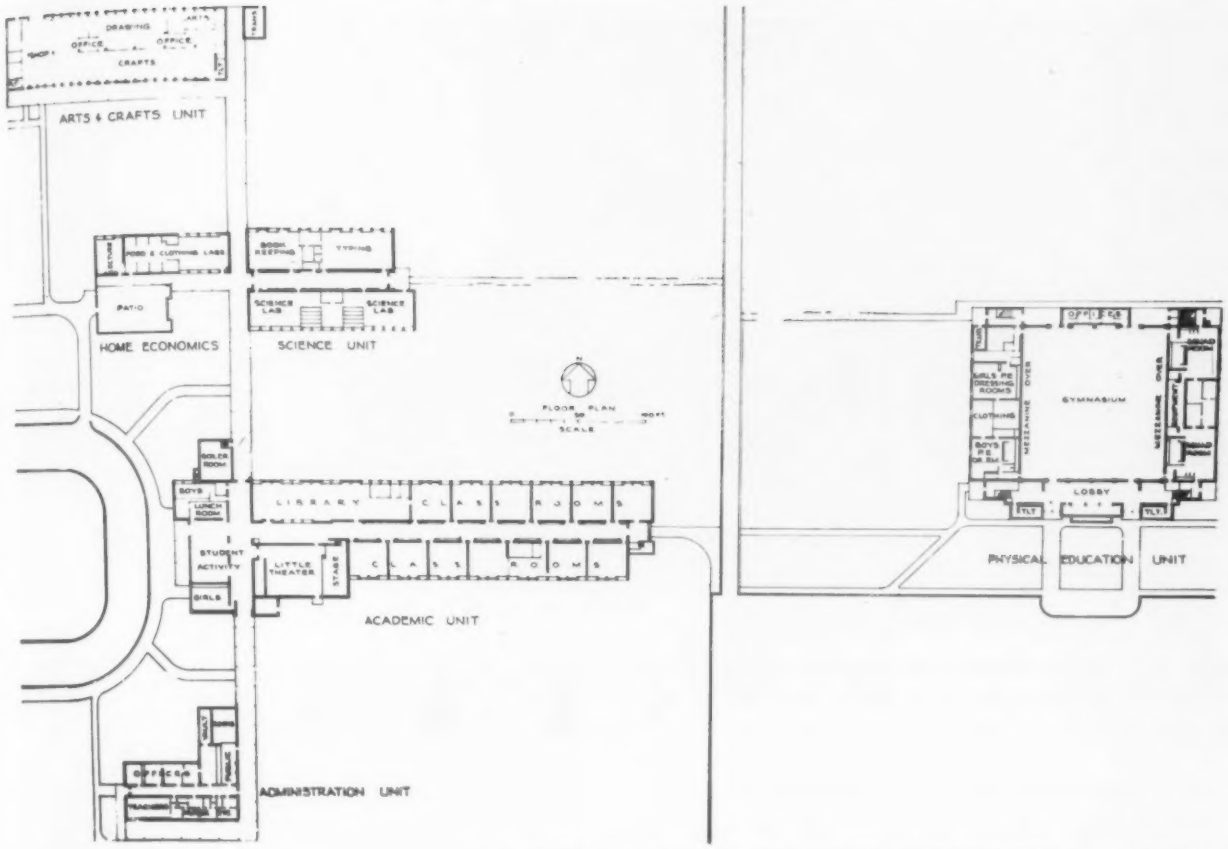
The north-lighted library with a study hall beyond the stacks is not only light-conditioned for eye comfort, but color-conditioned for a pleasant and cheerful atmosphere.



View of the health and physical education unit. A 900-car parking lot is located immediately in front of this unit.



A science laboratory. Elevated chairs in the background are used for lecture sessions. Also in the background is the glassed-in preparation room.



Site plan of completed units. Science unit can be enlarged and a new unit can be built across walkway from arts and crafts unit. North expansion is also possible.

made it mandatory that Hobbs define its immediate and long-range system-wide school plant needs before planning new school housing facilities of any type.

Early Selection of Architect

Before attempting to define the need for a new secondary school, the Board of Education selected its architects. The architectural firm of Vorhees, Standhardt and Swatek of Roswell, New Mexico, was selected because they are successful school architects; they limit their work almost exclusively to schools; and they consider school architecture an expression of education and design school plants for teaching and learning rather than as monuments to architecture.

Maximum teaching and learning benefits are possible from the important professional services of a school architect only when he takes part in the planning of the new school plant from the very begin-

Covered walkway connects all units. This one connects administration and academic units. Gymnasium can be seen in the background. The stadium is to the right.





Corner of the student center of Hobbs' new secondary school. Together with the library and little theatre, the student center is the hub of the school's daily class and social activities. A sandwich counter is located behind the grillwork. Wall niches to the right will display the creations of student artistry.

ning—from the preliminary identification of the needs for the plant and determining its location to the final detailed blueprinting of its every facility.

Research, Visits and Discussion

Following selection of the architects, maps and charts showing where school children live and the type home—permanent or temporary—they are living in; growth trends—past, present and probable future; highways, truck by-passes and railroads; main traveled streets; and locations of possible school sites were prepared for reference use in identifying the local nature of needs for a new senior high school.

These facts, plus ideas and information gathered from visitations to senior high school plants throughout the neighboring area, from conferences with school and lay leaders of neighboring communities, and from resource materials on the latest and most successful ways of planning a secondary school to meet the needs of today's students, were used as the subject for talks and discussions with school and lay groups.

Discussion and deliberation soon convinced all that Hobbs' needs could not be met by copying some other community's solution to its needs. Hobbs had to determine the custom-made solution to its own problems.

Determining Possible Solutions

Being not only a new community but a rapidly growing one, Hobbs is faced with having to provide everything from land for school sites to classroom equipment. The solution finally decided upon had to be pleasing to the taxpayer.

No building program can be carried out economically unless each of its parts fits into an overall long-range program that is both expandable and flexible, expandable enough to take care of increases in student loads, and flexible enough to be adaptable to the ever changing needs of the secondary school curriculum.



Mechanical drawing section of the industrial arts and crafts unit. This unit is one of the most diversified in the whole school plant.

Plans for Hobbs' secondary school fit so well into the school system's long-range school housing program, and were so well understood and accepted by the people of the community that only 16 people voted against the first school bond issue.

Size and Location of Site

It was agreed that the site should be secured before proposing and studying possible solutions and



Spacious typing room of the commerce unit is north-lighted for eye ease.

that, inasmuch as this was a school for older students, size was more important than location. The site had to be large enough for spread-out, campus style, single story construction. This type construction is not only less expensive dollar-wise, but provides ample parking space for today's "auto" age, and room and freedom for secondary students to grow and mature. Fortunately, the Board of Education was able to get ahead of booming prices and housing developments and secure a 48-acre site accessible to the entire community.



Functional home economics department of the Hobbs school. Sewing room is in the background. Teachers' desks are in the center and face either room. This makes it possible for the home economics department to be handled by either one or two teachers.



School publications laboratory is located between two English classrooms. English instructors also serve as sponsors of school publications.

In order to meet the community desire for the very best secondary school plant for its children, building models of possible solutions were constructed for study and analysis. The school plant ultimately designed was a multi-purpose community establishment to serve both individual student needs and overall community betterment and improvement. The building abounds with light and color-conditioned facilities for many different uses by the school during school hours and by community groups, including adult education classes, outside of school hours.

Final Solution of the Problem

Before final blueprinting of plans for construction of the community's new school home for teen-age folk, many sketches of each facility and its built-in features were made and detailed. These were studied and re-worked where necessary by the people who do the teaching and the learning in them—the teachers and the students.

When final designs for the school plant were agreed upon, the drawing and writing of plans and specifications were completed and submitted to the Board of Education for acceptance and approval. Since the entire plant was to be several years in the building, units to go up first were next determined. Then legal advertising and calling for bids on construction were carried out.

Building in Use a Year

The first units of the Hobbs secondary school have been in use a year. The results now being realized have proved that participation of everyone concerned in identifying problems and solutions through discussion and arbitration is an essential of successful school administration.

Thanks to a hard working and unselfish Board of Education and to a community attitude that accepts nothing less than the best of educational opportunities for its children, Hobbs has obtained functional facilities in its senior high school plant that secondary students in many communities are not privileged to enjoy.



General George W. Wingate High School, Brooklyn, New York, Kelly & Gruzen, architects-engineers. Circular element contains academic rooms, auditorium, cafeteria and art rooms. Rectangular arm houses shop and science units, topped by a library with terrace.

SCHOOL DESIGN IN-THE-ROUND



by B. SUMNER GRUZEN

Kelly & Gruzen, Architects-Engineers, New York, Newark and Boston

Prior to entering private practice Mr. Gruzen was associated with architectural firms in Boston, Massachusetts, with Emery Roth of New York and Stone & Webster on dam construction. He holds B.Arch. and M.Arch. degrees from Massachusetts Institute of Technology and did graduate work at the Ecole des Beaux Arts in Paris. As principal in charge of architectural design and planning, Mr. Gruzen has designed and supervised the construction of public buildings, hospitals, industrial plants, schools, large housing projects, separation centers and cantonments.

WHEN the New York City Board of Education made the first public announcement of plans for the General George W. Wingate High School, readers in Metropolitan New York picked up their newspapers to find such intriguing headlines as, "CITY TO GET SCHOOL SHAPED LIKE BANJO,"[1] "AT LAST! CITY WILL OFFER REAL ROUNDED EDUCATION"[2] and "BANJO SCHOOLHOUSE STRIKES NEW NOTES."[3] Before long the firm of Kelly & Gruzen, designers of the Wingate High School, was receiving letters from educators and architects throughout the country, requesting more information on the "Banjo-School" in Brooklyn, New York.

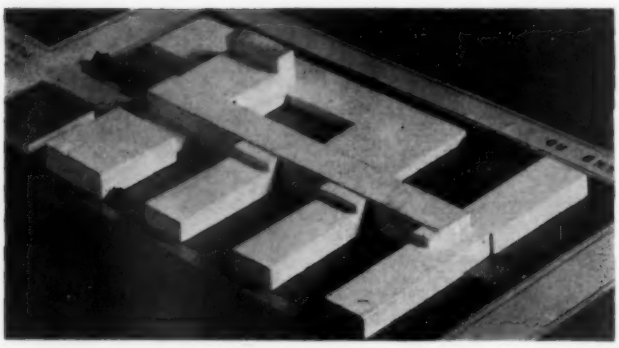
It was later revealed that this harmonic adjective sprang from the imagination of a newspaper reporter who, in the face of a deadline, was seeking an appropriate and space-saving description of the building's overall appearance. "New notes" and freedom of the press notwithstanding, the architects' intention was to design a comprehensive high school for New York City which would most effectively and economically solve specific educational problems peculiar to large urban communities. Naturally, the solution was expressed in the language of architecture—that is, in the design itself. The novel press treatment perhaps overshadowed the basic architectural intent, which will be unfolded in the following paragraphs.

Largest Project Planned by NYC

As the largest unit among 22 school building projects planned by the New York City Board of Education under the city's 1952 Capital Budget Program, the Wingate High School was established to relieve the Samuel J. Tilden, Erasmus Hall and Thomas Jefferson High Schools in Brooklyn, all of which have been operating on extended time schedules. The Board's overall construction program included new buildings, alterations and additions, and was planned for an enrollment capacity of 25,000 pupils.

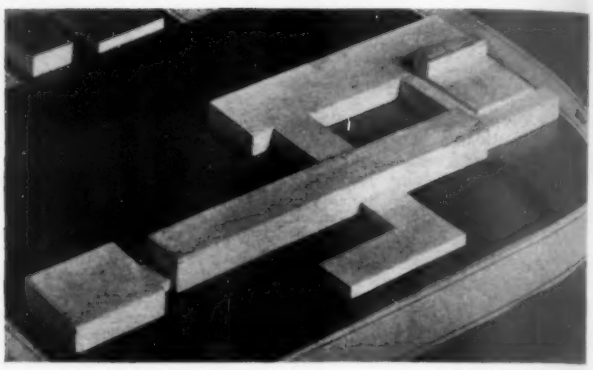
The major aims of the program were to end overcrowded conditions and to provide sorely needed and overdue facilities for the the city school system. Early

[1] *New York Times*, July 18, 1952.
[2] *New York World-Telegram and Sun*, July 18, 1952.
[3] *Christian Science Monitor*, January 17, 1953.

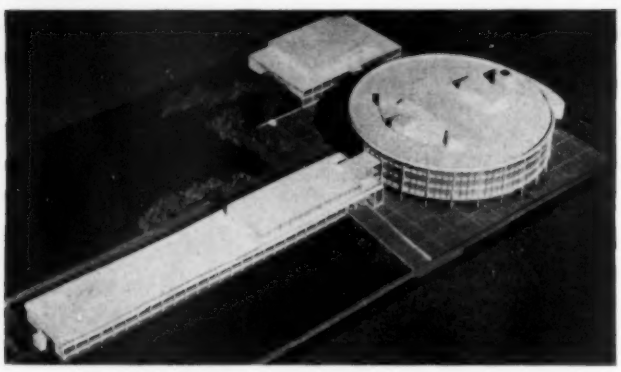


Block model of Scheme I. This finger plan has major elements located in separate wings.

Model of Scheme II. There is a main academic block with auditorium, cafeteria and shop rooms located in the separate wings.



Scheme III, the "Banjo Plan" finally accepted by the New York City Board of Education.



in 1952 the program received official approval, with the provision that all plans were to be completed in time to permit construction contract awards before the end of the year. The Wingate High School, for which final plans were completed in November. 1952, and ground was broken in January, 1953, was the first new high school to be placed into construction by the Board since 1941.

Kelly & Gruzen, along with a number of other private architectural firms, had been commissioned to assist the Bureau of Construction in preparing designs and working drawings for the accelerated building program.

Freedom of Design Expression

From the outset, Kelly & Gruzen was able to approach its particular problem without the limitations of restraining design criteria. A new policy of the Board, introduced in recent years, encouraged greater freedom of expression by private architects; and it was with an understanding of each other's aspirations and functions that the architects and the Board's architectural staff coordinated their efforts and proceeded to carry out the project.

The criteria of the new high school called for the design of a comprehensive school which would combine at one location the academic, commercial and vocational curricula (incidentally, the first such school planned in the city's history) with a budget allowance set at six million dollars. It was particularly encouraging to our firm to be doing this comprehensive school since we had pioneered a similar type of plant for Passaic, New Jersey.[4] To an architect, the challenge of integrating academic and vocational units in one plant is a tremendous one. Designing such a school involves not only the physical elements of a building but also a greater consideration of the students' adjustment to changing educational concepts.

Problems of Site Size

There was, however, a more practical challenge. The school was to accommodate 3,000 students, and was to be erected on an 11-acre site, of which about six acres, owned by the City's Park Department, was to be developed as the athletic field and playgrounds. From the educator's point of view this was a highly inadequate building site. From the architect's, it was beyond consideration! In most cities today 50 acres is held as a minimum area for a project of such size and scope. But in New York City 11 acres is considered spacious, even luxurious, in the light of prevailing land costs and shortages.

[4] "Design for Schools," AMERICAN SCHOOL AND UNIVERSITY, 1951–52, p. 283.

The design problems, then, were more analogous to those of higher educational buildings than to typical secondary schools. Decisions on general size, width and height are determined by the ratio of available space to the required facilities. With such an unwieldy ratio as the one presented in the Wingate school, the plant had to be larger, taller and more compact than those in rural and smaller urban areas.

On-the-spot observance of typical city high schools in operation showed the architects that some of the most serious problems facing the educators were those of general student supervision and traffic control. Normal teaching functions were being hampered by congestion, confusion and time loss during class changes and movements to and from areas of large group assembly. These problems are inherent in the sheer numbers of city high school students.

Traffic at corridor intersections, at stairs, exits and entrances to cafeterias and auditoriums requires the extra burden of personal supervision by teachers. Open courts, common to most schools, also present supervisory problems, since they are difficult to patrol and protect against after-hours vandalism.

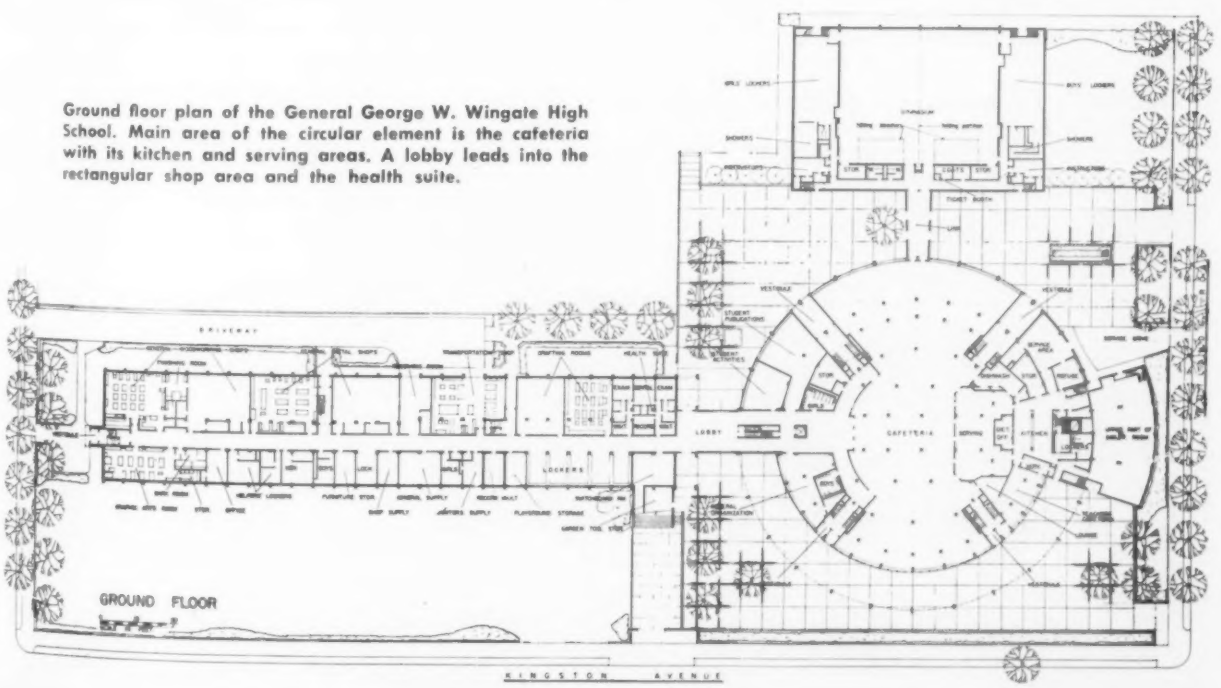
To cope with these problems, an inclination to design the school with too much emphasis on supervision had to be constantly tempered, else an educational prison would have resulted. If the school was to be truly comprehensive, the design must combine the limited elements of space with every advance in contemporary school planning to be able to perform a particular task in a very non-typical community.

Three Preliminary Solutions

Three distinctly different preliminary solutions were submitted to the Board for review. Scheme I employed the finger plan, setting the height of the build-

Preliminary Cost Estimates
General George W. Wingate High School

	Scheme I	Scheme II	Scheme III
Amount of Budget	$6,000,000	$6,000,000	$6,000,000
Architects' Estimated Cost of Building Construction at Completion of Preliminary Plans	$5,415,400	$5,128,900	$5,110,000
Actual Cost of Construction (Scheme III Finally Selected)			$5,115,972
Total Cubage	3,890,082 cu. ft.	3,670,066 cu. ft.	3,669,503 cu. ft.
Cost per Cubic Foot	$ 1.39	$ 1.40	$ 1.40
Capacity of School	3,000	3,000	3,000
Cost per Pupil	$ 1,805	$ 1,709	$ 1,703
Total Area	261,288 sq. ft.	243,806 sq. ft.	246,262 sq. ft.
Percentage of Corridor Area to Total Area	20.9%	17.7%	17.4%
Perimeter Wall Area	127,533 sq. ft.	98,386 sq. ft.	94,648 sq. ft.



Ground floor plan of the General George W. Wingate High School. Main area of the circular element is the cafeteria with its kitchen and serving areas. A lobby leads into the rectangular shop area and the health suite.

ing at two stories, and locating major elements in separate wings. The architects felt that this plan provided excellent working conditions, with a healthy and stimulating environment and freedom from the dogmas of institutional planning. Vertical circulation was considerably reduced and classroom wings were comparatively short.

It was estimated that this plan would have cost about $250,000 more than either of the other two schemes. Since local building codes would not allow use of the economical construction which is ideally suited to this form of plan, it was the architects' view that such a contemporary approach to school planning would have to await revisions of the building code. That is, unless the Board felt that the scheme's qualities warranted the additional expenditures to make it completely fireproof. The Board turned down the plan because of the long travel distances, the courts which would be difficult to protect against vandalism and the additional cost over the other schemes.

Scheme II had good placement of the main elements, a simple traffic flow pattern, economical construction features, and also represented a departure from school planning techniques which have been associated with New York schools in the past. The main travel between classes was confined to one straight element, 450 feet long and three stories high. This simple form had the advantages of a close relationship among academic departments and ease of student travel.

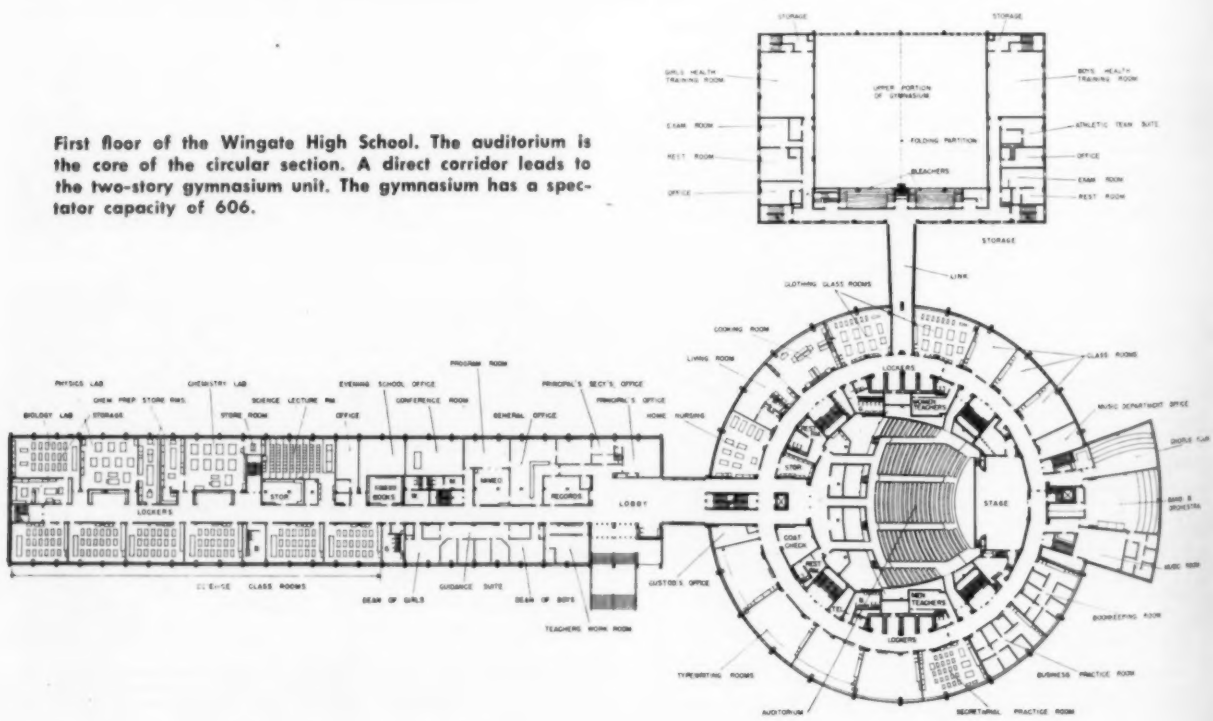
The Board decided there would be bottlenecks in circulation and that the courts, while fewer than in Scheme I, would be a source of trouble.

Scheme III, which eventually came to be known as the "Banjo-Plan," was the plan accepted by the Board. The general reaction was that its circular design provided the most economical and effective solution to the major problems of congestion, time loss, travel distances, protection of courts and supervision—without sacrifice of educational standards.

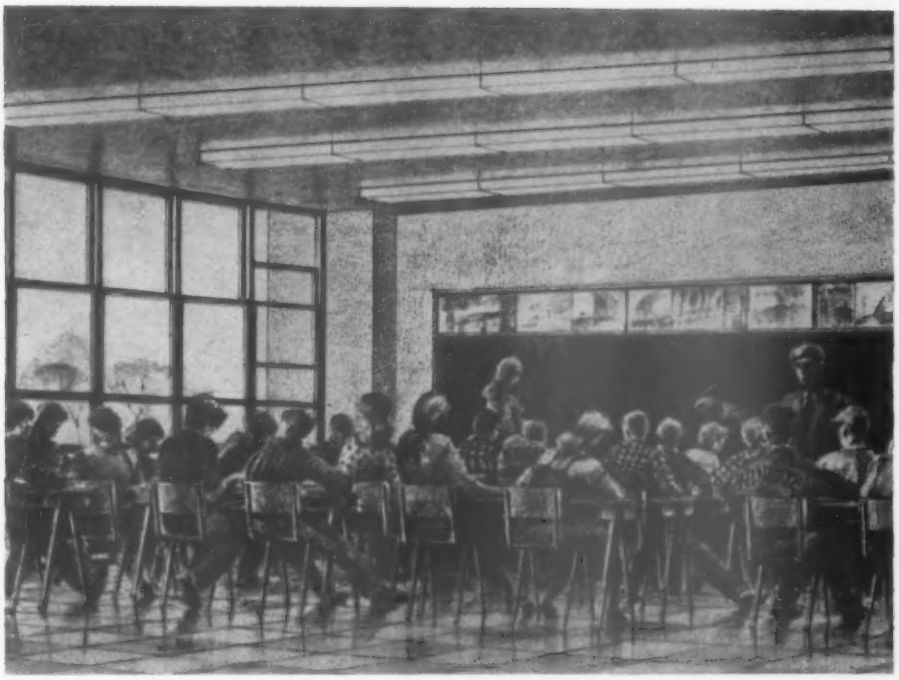
By concentrating all but the science and shop classrooms on three floors of the circular unit, 235 feet in diameter, with the cafeteria and service areas on the ground floor, the average travel distance between classes is brought to a minimum of one-half the distance around the circle. Four large stair towers, set at equidistant quarter points of the circle, lead directly down to the cafeteria as well as to the outside plaza upon which the circular element rests. With this arrangement 1,000 or more of the student body can go to lunch with the least amount of congestion and by the shortest routes, and can also congregate on the plaza in free moments after eating. The unbroken circular flow of traffic eliminates the hazards and confusion of intersections. Students can enter the academic section from five main points off the plaza.

Auditorium Is Core

Usable area is heavily but effectively concentrated (percentage of circulation area to total area is 17.4 percent). The core of the circle is utilized for the 1,200-capacity auditorium, with an eye to the economy of eliminating exterior auditorium walls. This arrangement, together with the location of the cafeteria beneath, makes it possible for every classroom to face the perimeter of the circle, affording good light and view.



First floor of the Wingate High School. The auditorium is the core of the circular section. A direct corridor leads to the two-story gymnasium unit. The gymnasium has a spectator capacity of 606.



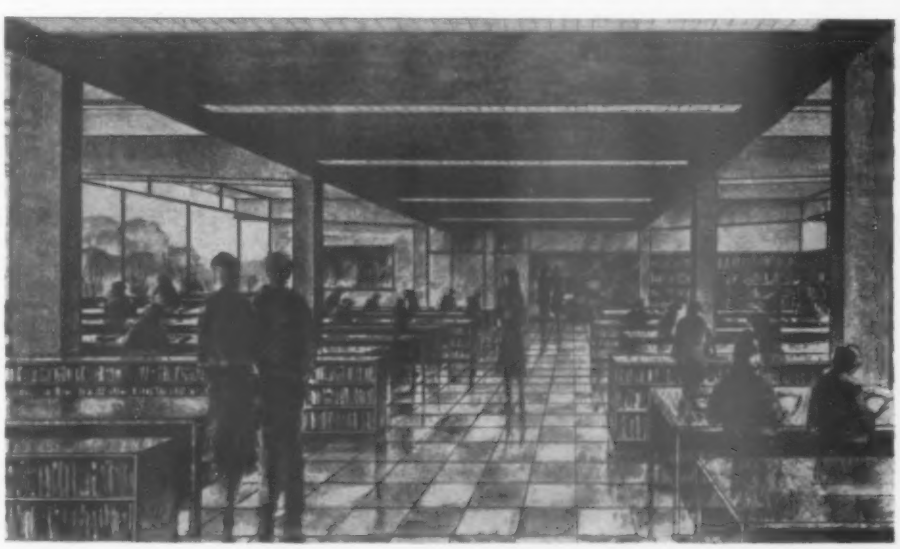
Typical classroom within the circular element of the school building. There are 29 standard size classrooms within the circle.

There are twenty-nine standard size classrooms in the circle, four English visual-aids rooms, ten social studies visual-aids rooms, one home nursing room, a home economics unit which includes a cooking room and a model apartment, three student activity rooms and four north-lighted art rooms on the top floor. The shell behind the auditorium stage encompasses three music rooms, including a band practice room, so that the heavy sound insulation provided is further abetted by physical isolation from the regular classrooms.

Shop-Science Wing

In the shop-science wing, which is directly connected to the circular building, diversified shop classrooms, including two drafting rooms, two woodwork shops, two metal work shops a transportation shop, an art craft shop and a graphic arts shop, are all on grade for convenience in loading and handling special machinery. On the first floor six science classrooms, three laboratories and a science lecture room occupy the major portion of the wing, with the administrative and guidance offices located close to the circular unit. A sunny and quiet library, surrounded by an outdoor terrace, tops the shop-science wing and is connected to the second floor of the circular unit by a short link.

The two-story gymnasium wing is easily accessible to the circle through a direct corridor which can be completely separated from the rest of the building for community activities. Both the gymnasium and auditorium are convenient for community use and, yet,



Library of the General George W. Wingate High School. This area tops the shop-science wing and is connected to the second floor of the circular element by a short link. The library is surrounded by an outdoor terrace.



This corridor is the connecting link from the many shop areas and science classrooms, laboratories and lecture room to the circular element of the building.

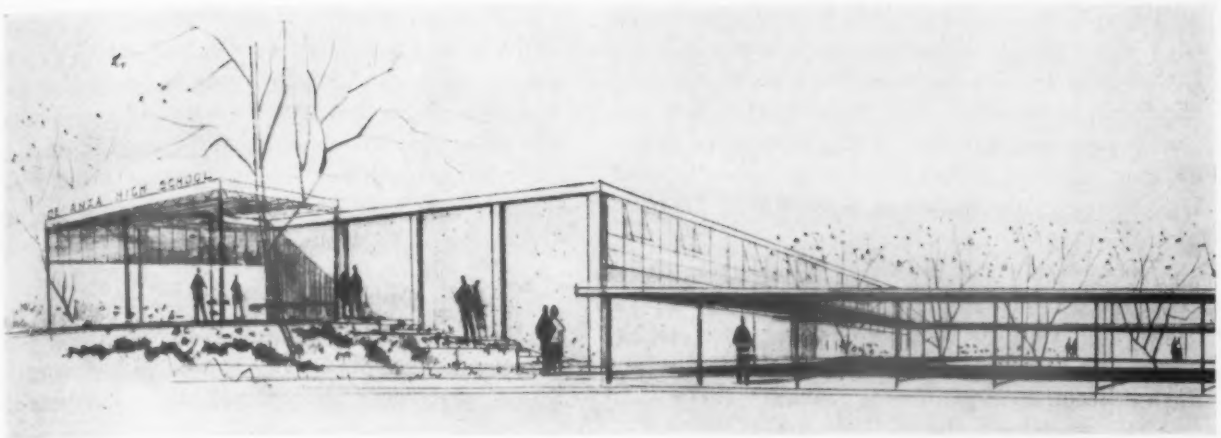
like the library and music rooms, the gymnasium is isolated without being too far from regular classrooms. A motor-operated folding partition divides the gymnasium, which has a spectator capacity of 606.

Modular System Employed

The building, designed in limestone columns and glazed grey brick spandrels, employs the modular system, resulting in evenly distributed, easy-to-divide space and economy in both the mechanical and structural phases. With the exception of the steel gymnasium and auditorium, the use of reinforced concrete construction with large flat slabs unbroken by beams except along corridor walls makes it possible to leave the smooth underside of the slabs exposed for many ceilings, thus eliminating expensive furring and plastering. Where acoustic treatment was required, the acoustic material was attached directly to the slabs. Heating, ventilating, plumbing and electrical work are concentrated with short mains and stacking of utilities. Additional economies were effected by the use of smooth lightweight concrete block for most interior partitions with no treatment other than painting.

Construction bids which were received for the project in December, 1952, totalled $5,115,972, as compared with Kelly & Gruzen's preliminary cost estimate of $5,110,000; these bids reflected a savings of almost $900,000 from the original budget allowance of six million dollars.

The Board of Education's acceptance of this design and the satisfactory results of the construction bids were a strong indication that the principal merits of the plan lay not so much in its unique design, as in its realistic approach to an educational problem. The nature of the inquiries we have received from educators and architects reflect a concern with similar problems, leading us to believe that this approach to big city school planning may have widespread applications.



Main entrance and administration building of the De Anza High School, El Sobrante, California. John Carl Warnecke, architect.

THE DE ANZA DESIGN: AN AMERICAN HERITAGE DEFINED



by JOHN CARL WARNECKE

Architect, AIA, San Francisco and Oakland, California

John Carl Warnecke, AIA, attended Stanford University and received his Bachelor of Architecture degree at Harvard University. In his San Francisco and Oakland offices he has a highly talented group of 25 men especially qualified in research and design. Mr. Warnecke's designs for the Mira Vista Elementary School, El Cerrito, and for the White Oaks Elementary School, Annex, San Carlos, California, received top awards in the 1951 and 1953 Competitions for Better School Design, sponsored by *The School Executive*.

IT IS now less than ten years since the little California city of Richmond, just across the bay from San Francisco, was thrust dramatically before the American public as a community whose citizens, one and all, had earned the Purple Heart. Richmond, in 1940, had a populaton of 23,000, prided itself on its efficiency and self-sufficiency. Principal employment came from local branches of the Standard Oil Company and Ford Motor Company, and some smaller industries. But Richmond's deep water resources and wide stretches of unoccupied land quickly marked it for defense production. Before long, four federally-owned, Kaiser-operated shipyards and a prefabrication plant were building ships by the hundreds—550 in fact by 1944. Almost overnight 24,000 temporary war housing units had sprung up within the city and thousands more outside.

Schools were holding double and triple sessions, in extreme cases were on a four-shift basis. Juvenile delinquency rose to an alarming high, and Richmond became a problem city, calling to the Federal Government for help . . . "not a trickle but a stream."

Population had swollen many times its normal size, and many newcomers decided they liked the place and wanted to stay. When it had time to think of the future at all, Richmond planned ultimately for a permanent population of 50,000 or 75,000 at most. But by January, 1952, Richmond was California's ninth largest city (100,000 population) and, according to census reports, led the nation in growth during the preceding decade for cities of more than 25,000—a growth of 319 percent in ten years. School enrollment increased 484 percent.

Growth in the Schools

Professional educators do not need to be told, in facts or figures, what a crisis such precipitate growth brought about in the public schools. The challenge has been met with both courage and vision, and today the

Richmond School District, which is responsible for the city's elementary schools, and the Richmond Union High School District, which covers a wider area, are effectively commanding the situation. Our firm previously had designed Mira Vista Elementary School for the Richmond School District and Portola Junior High School for the Richmond Union High School District.

Now, on a site of 52 acres the Richmond Union High School District is building its new high school, named after De Anza, early Spanish colonizer of California. Our office has been commissioned to carry out the architectural design.

The Richmond Union High School District is the fifth largest high school district in California. It reaches from Albany on the south to Rodeo on the north, covering 150 square miles. The city of Richmond is the pivotal point of all this area. Residential development has broken through all the old corporate boundaries and overflows into the valleys and up into the hills.

The community of El Sobrante, where the new high school site is located, is in one sense a suburb of Richmond, while in a still more suburban sense it belongs to the greater metropolis of the San Francisco Bay Area.

First High School Since 1939

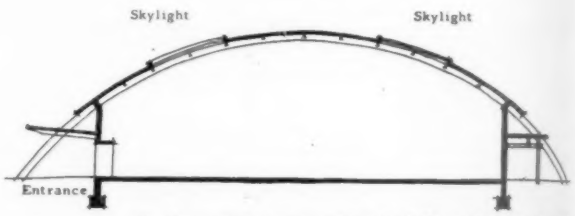
The district had not built a complete new high school since 1939 and this was the first time they had a high school site large enough to do all they wanted. They chose this open country location because it was a good place to spread out a large school and let it grow, but also because it was central to the area it would serve and because, in the end, El Sobrante showed the signs of coming growth. Less than three months after the site had been selected, the Utah Construction Company, large developers in this area, announced plans for a 1,500-home subdivision directly across the road from the De Anza site.

The high school is eventually for 2,000 students. In the interim it is to serve junior high school purposes also. It will have a broad community function as well. And, because of this, it was assured of a greater degree of community interest from the start. In short, De Anza was immediately looked upon as a community center and school. The limited dollar gave the idea added appeal, to double up on facilities.

Openness to New Ideas

Such a project obviously had challenging possibilities. Contra Costa County as a whole is proving that where communities are new and vital, precedents also are few, and prejudices as well. Thus unhampered, we saw in De Anza an opportunity to find a fresh approach and work out new ideas, and this theme underlies the story of the evolution of a design for this new high school.

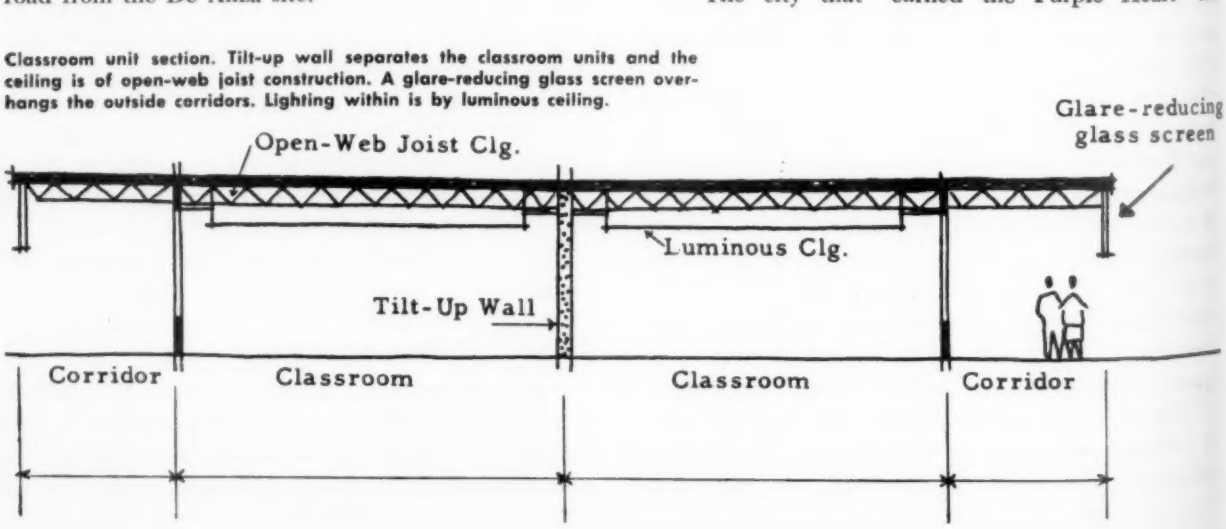
In the case of the Richmond area this genuinely progressive open-mindedness in school planning brings to a focus a whole reintegrated community's efforts to offset the crippling effects of the war years. Here is a vitally new community composed of the most varied elements, and side by side with the old residents a new population which has come within a decade from all parts of the country and represents all gradations of education and background.



Section of the gymnasium building. The steel arch construction is reinforced with concrete buttresses.

The city that "earned the Purple Heart" has

Classroom unit section. Tilt-up wall separates the classroom units and the ceiling is of open-web joist construction. A glare-reducing glass screen overhangs the outside corridors. Lighting within is by luminous ceiling.



claimed its heritage. A people striving for a better way of life under twentieth century pioneering conditions have defined their needs in twentieth century terms. Suitably, the design of their new high school reflects the industrial character of the region.

It will be a few years yet before the whole project is completed, for it is to be built in stages, but here it is, worked out to the last detail and the first stage already begun.

Thesis of the Design

The general thesis for design of De Anza High School was to employ, so far as feasible, the most modern industrial design principles with light steel, concrete and glass, and wood inside, as the predominant materials, and to find beauty in their simplicity, suitability and functional use.

Industrial methods have been proven to contribute much in the way of economy and at the same time help to provide better ventilation, lighting, etc. and greater flexibility. Savings in construction time are also possible.

Exposed steel elements, while carefully designed for beauty, could be used extensively, we found, the emphasis being all the while on getting the most for the dollar, which is the ever-present problem in school planning.

California open planning, first successfully developed on a major scale at Acalanes High School, the widely known example of finger plan design, goes on to a new stage in De Anza. Here we have a main classroom block with a central core which serves as a concentrated, enclosed service area for lockers and toilets and for the principal through traffic, with the six classroom wings served by open corridors. This results because the one over-all roof is punctured with wide patios for air and light and classrooms are back to back.

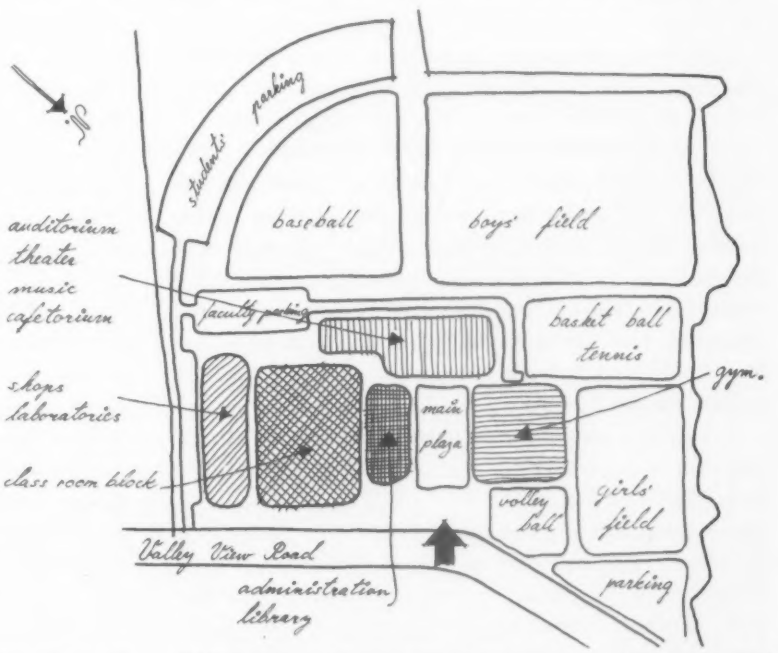
Tilt-up walls, one form of economy, and luminous ceilings, an equally new mode of efficient lighting, are utilized in this classroom block. Before planning the block we had to find our first point of orientation on the site, and before doing even that, of course, we had to get down to the basic educational philosophy. An entirely new phase of Richmond's educational evolution begins there, and hence the background of De Anza.

How the Schools Won Support

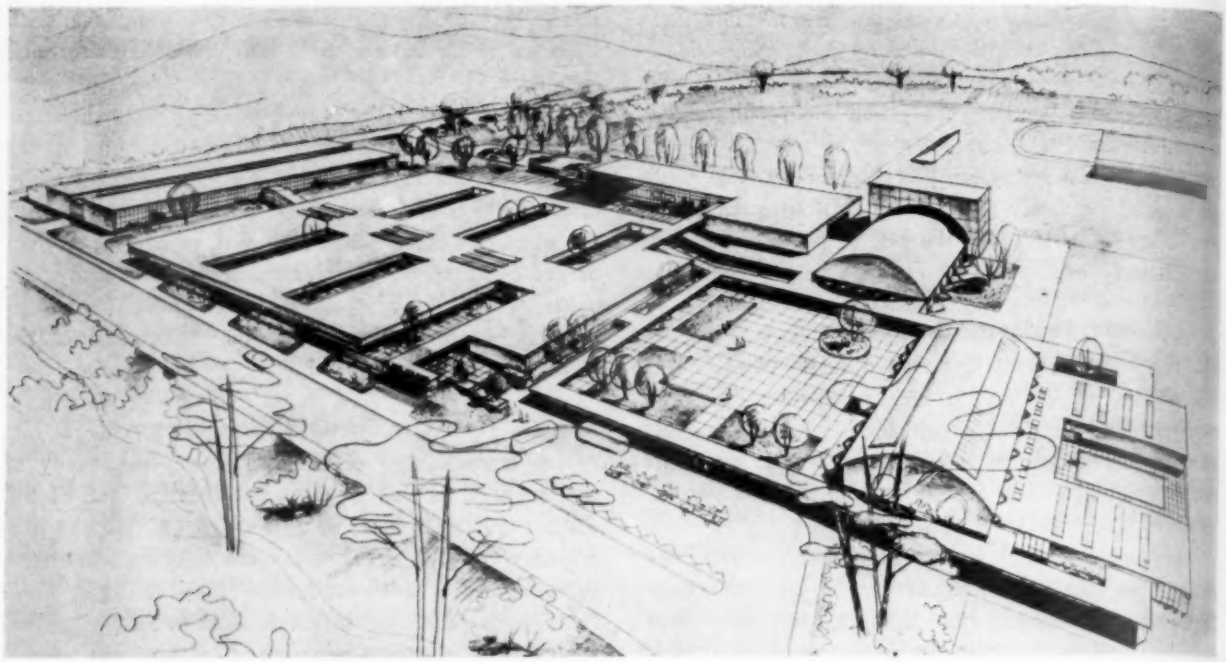
A cross section of citizens, themselves, many of the teachers, as well as the administrative staff of the district, all had a hand in developing De Anza's specifications and the way they were translated into the building plans. This goes back to January, 1952, when Dr. George D. Miner, superintendent of schools, called together a representative group of 50 men and women to help pull the schools through their continuing crisis. Through the support of this citizens' committee, residents voted to bond themselves to the legal limit until 1960, and a long-range program was developed and financed.

Out of this first committee evolved a second which continues to function in advisory capacities. This steering committee was active in the planning of De Anza, which has $1,650,000 of Federal assistance under Public Law 815.

Donald Woodington, director of schoolhouse planning for the Richmond schools, was named coordinator of the program, and then there began the very interesting and fruitful teamwork between administrators,



Main elements of the De Anza design include areas for shops, laboratories, classrooms, gymnasium, administration and cafetorium. There are separate outdoor fields for boys' and girls' athletics and a baseball diamond.



Master plan for the De Anza High School, El Sobrante, California. The school will be located within the Richmond Union High School District.

architect and citizens which resulted in the De Anza program.

A Program Evolves for Evaluation

We worked closely with Mr. Woodington and the various faculty and citizen groups and, at three stages of the preliminary work, meetings were held to review the progress of the program. Science teachers suggested the types of laboratories they preferred; home economics teachers outlined types of rooms in which they would like to work; art teachers, shop instructors and others did the same.

A special committee of physical education instructors was formed to state the conditions they considered ideal for the gymnasium. And then, of course, the overall development of the site was thoroughly discussed. Throughout all of this coordinated activity a full program had been developed—numbers of rooms, types of rooms, relationship of rooms and units, facilities to be provided in the first stage and the second stage and in the third stage.

In the end the citizens' steering committee critically reviewed all of the plans and contributed in planning the most minute details of design and materials. So it was that citizens and teachers all had a real participation in the design and, while experiments were made along the way, they were made with a maximum of teamwork between architect, educators and community.

We can therefore say that De Anza was the result of the most thorough type of cooperation which could have been effected in these circumstances. However, we are well aware that no matter how carefully planned and over how long a period of time, the final test inevitably comes when the building is up and in use, when you have the look of it, the feel of it and the practical experience in using it.

Philosophy Reflects Social Needs

The philosophy behind the design brings us back to the conditions which existed in Richmond during its worst period when delinquency and truancy were at their peak. We, therefore, were all more intent than we otherwise might have been on creating conditions here which would make school both attractive and profitable to adolescents. What are the things that adolescents most need? From all that we knew and all that we could find out we agreed that pleasant places for them to congregate, both indoors and out, between and after classes, were important.

We were intent on halls and corridors which could serve other purposes than merely for circulation, and we became occupied with the idea of a large outdoor "milling area" where students could congregate in the open between or after classes. This area, at the same time, would separate the major building groups and serve somewhat the same purposes as a quadrangle. (As it turned out, the central concourse running through the main classroom building provides the desired indoor gathering place between classes.

whereas the "milling area" became in our plan a central plaza fronting the administration building, auditorium and gym.)

One-Story Buildings Desired

In line with modern trends in school design in California and throughout the nation, the school authorities desired one-story buildings. But in the belief that open corridors were impractical for high schools their thinking led to enclosed corridors and, in fact, double-loaded corridors which they thought would favor the smoothest movement of faculty and students.

They had observed many schools with open corridors and found that where rain, wind and also fog are prevalent (as they are in certain regions of California, contrary to popular belief) the open corridors frequently become damp and wet. Under such conditions, lockers placed in the open often get wet and rust; and traveling from one end of the school to the other through open corridors has its disadvantages too, whereas in elementary schools there is less movement between rooms.

As will be explained later, De Anza did end up with sections of open corridor, but only after the above objections had been grappled with and overcome by the use of the long, closed concourse, which is its special feature.

Description of Site

The site of 52 acres fronts on Valley View Road, near the intersection of May Road. It has street frontage on one side only, being backed up against residential sites on other sides. While generally speaking it has the formation of a plateau, only 35 acres were considered usable due to the irregular nature of the remaining portions.

A "back door," the width of one home site, was later provided for access to and from the football field, on the May Road side, where there is a fringe of homesites between the school lands and the road.

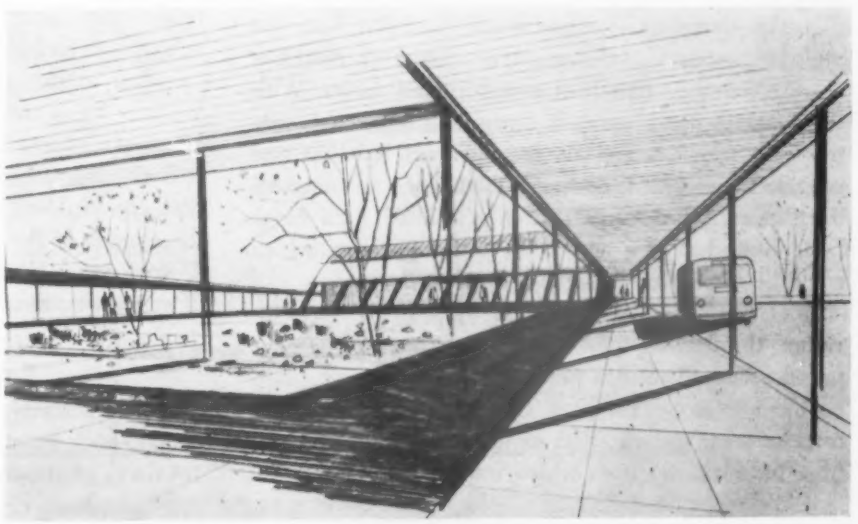
It was obviously natural to begin by locating the administration-library unit at a central point on the Valley View Road side, which was the flattest area as well as the most accessible, and establish the main entrance accordingly. The main classroom group, the shops and laboratories, then fitted in very well behind the administration-library unit and along Valley View Road, where they could have easy access by students. The slope of the land upwards in this direction indicated grading to three different levels.

Zones Emerge

With these key buildings "anchored" to the site, the other buildings and facilities were allowed to "float" into the zones most suited to their space needs and their use. Certain zones obviously would be more used by the public than others.

The large, open "milling area" took form directly in front of the administration-library unit, becoming a sort of entrance plaza and spatial barrier between the building zones. Directly across the plaza from the administration-library unit, and in a zone of its own, surrounded by various outdoor sports areas (tennis, basketball, volley ball, etc.) would be the gym unit, with boys' and girls' gyms, locker and shower rooms, etc., and a place for the future swimming pool.

Across the plaza a place was marked off for the future auditorium and, beside this, the cafetorium, little theatre and music rooms. With the main buildings provided for in this way, the southern extremity of the site, curving as it did and with the high elbow-like embankment, was an ideal spot for the baseball diamond. When carved out suitably it would be perfect in size and shape. Then moving toward the north, as the embankment continues along this entire side of the site, a football field could also be placed with a natural grandstand alongside.



View of the main plaza of the school. Gymnasium can be seen in the rear. Covered passage is leading from the administration-library unit.

COST OF VARIOUS ILLUMINATION SYSTEMS FOR ONE HIGH SCHOOL CLASSROOM

INITIAL COST OF CONSTRUCTION:	A. LUMINUOUS CEILING WITH NO DAYLIGHTING	B. FLUORESCENT PLUS DAYLIGHTING	C. INCANDESCENT PLUS DAYLIGHTING
Skylighting costs including brightness control @ $4.00 per sq. ft. for 1/8 of ceiling	not needed	$ 1200.00	$ 1200.00
Skylight framing	" "	$ 150.00	$ 150.00
Cost of electric lighting including fixtures, lamps, wiring and installation	@ $2.22—sq. ft. $ 2000.00	@ $1.11—sq. ft. $ 1000.00	@ $0.55—sq. ft. $ 500.00
Paint Plenum—High Reflecting White	$ 80.00	not needed	not needed
Cost of finished ceiling (3/8 acoustic tile)	not needed	$ 360.00	$ 360.00
Total cost of illumination construction	$ 2080.00	$ 2710.00	$ 2210.00
OPERATION—ANNUAL COST:			
KW installed (electric energy)	3	3.6	9
Annual hours of operation (assume 200 days/year)	2000 (10 hr. day)	1400 (7 hr. day)	1400 (7 hr. day)
Annual energy cost—$.021 x hrs. x KW	$ 126.00	$ 106.00	$ 264.00
ANNUAL CHARGES:			
Annual cost of electric lighting amortized for 10 years plus 5% for interest and insurance	$ 300.00	$ 150.00	$ 75.00
Daylighting and structural devices amortized for 25 years plus 5% for interest and insurance	No expenditure	$ 153.00	$ 153.00
Energy cost (annual) Lighting	$ 126.00	$ 106.00	$ 264.00
Additional heating and ventilating costs due to daylighting	No expenditure	$ 25.00	$ 25.00
TOTAL COST OF ONE ROOM PER YEAR	$ 426.00	$ 434.00	$ 517.00

The Block and the Core

Once the "floating" zones had been firmly anchored to the site, and plans had been made for carving out the embankments and levelling the land, actual design of the units began. Since the classroom section was the starting point and embodies the more special features, the approach to design necessarily centers there.

The classroom elements were visualized from the very beginning as a *block* rather than as a rambling or spread-out formation of corridors and wings. With this block in mind, we next thought in terms of a central *core* which would tie the elements together and provide for central locker and toilet space and internal circulation. These early concepts resulted in a block built around a core and under one large roof which could be punctured by light and air wells.

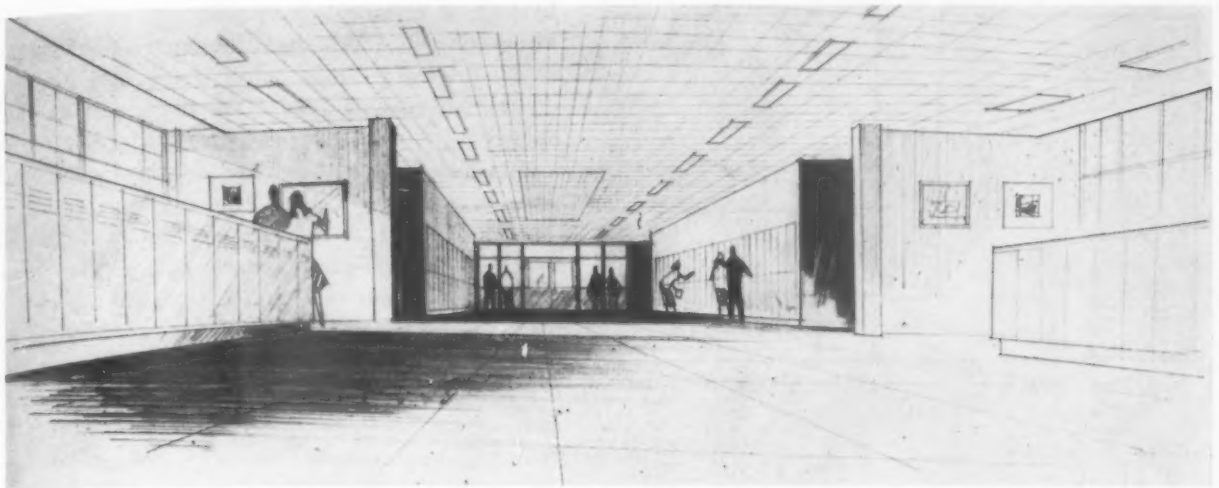
At this time, however, double-loaded closed corridors throughout were considered for the reasons stated earlier. The idea persisted that something could be done to avoid the high cost of so much enclosed corridor area, and also that something could be learned from industrial methods which would benefit the plan.

We recognized that in California, recently, great strides have been made in using the tilt-up type of concrete construction. But while this had been practical for warehouses, little had been done to apply it in schools. Architects and school superintendents had been probing into these possibilities and we ourselves, and Dr. Miner, the superintendent of this district, had made field trips and gone into other research as well. Our observations had shown that, for one thing, too much was "going on"—doors, windows, etc.—in the school wall to make tilt-up construction practicable.

Just at this time we had received a study from William W. Caudill (Caudill, Rowlett, Scott & Associates, Architects & Engineers) on the subject of back-to-back classrooms. This study was concerned largely with the problem of ventilation of such type rooms in the climate of the southwest, and showed the use of a 2½-foot space between the backed-up walls for air flow, utilities, etc.

Back-to-Back Rooms

In this study we began to see the possibilities of back-to-back rooms with a simple wall between without doors or windows, a concrete wall which could be put up in large expanses by the tilt-up method. Such a



Central core of the De Anza plan has three units of back-to-back rooms on either side. Located here are lockers and display areas.

concrete wall, we concluded, would have numerous advantages, becoming a sheer wall to take lateral forces due to earthquake, as required by law in California schools, and at the same time providing an excellent sound and fire barrier. Since the outside glass curtain wall which would then be used could take no lateral force, a strong central backbone would be indicated. We then saw how roof planes could be extended to form covered corridors on the outer side and how these extensions would serve as a shield against sun and rain.

But here was the hitch, at least momentarily. Open corridors were not what we had started out to obtain, and they are usually not placed on the window side of classrooms. It is true, however, that such departures have been made successfully in California and that we ourselves had varied from the conventional pattern in the reverse plan of the Mira Vista Elementary School.

Main Concourse As a Spine

Gradually the whole solution came to focus. We could put the main through-traffic in the core, a long enclosed corridor or concourse and also toilets, lockers, etc., where they would be protected from wind and rain. The open corridors, running crosswise, would each pass but a short row of rooms and the between-class traffic (which is one objection to corridors on the window-side) would then be very occasional.

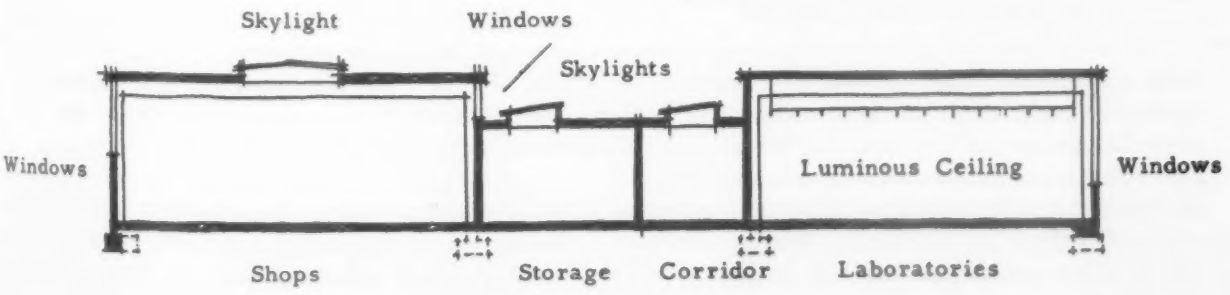
The central core, with three units of back-to-back rooms to either side, produced the block we had visualized. The "punctures," or light and air wells actually became much more than that, more like spacious, airy patios between the wings which could be broken with planting areas and made more livable, if desired, with benches. A covered corridor completely surrounds the block.

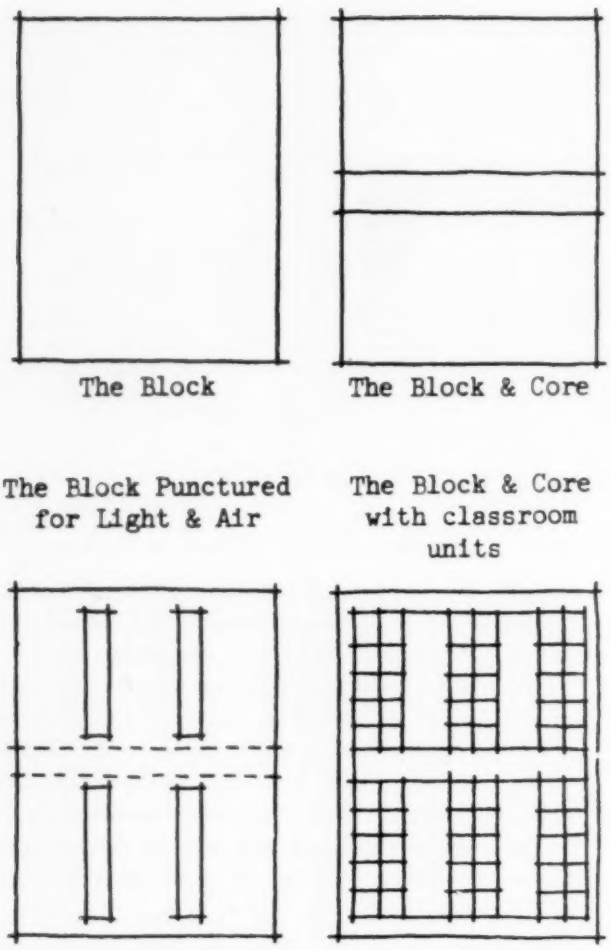
Light and Shade

In this arrangement of the classrooms, the only daylight would be from one side of the rooms, the exposures being *northwest* or *southeast*. The latter side would have considerable sun in addition to the occasional rain, and we did not feel that the covered corridor alone would control them adequately. We therefore developed a screen which would extend from the roof down to a seven-foot level, and constructed of ordinary steel sash with green glare-reducing glass.

While the direct sunshine and skyglare would thus be eliminated, we then had to face the necessity of more artificial light. So, therefore, the design of the classrooms would not result in a net saving so long

Section of the shops and laboratories unit. Storage corridor separates the areas. Shops have skylights and clerestories.





Early concepts developed as shown into a classroom block built around a core and under one large roof punctured by light and air wells.

as we had to think in terms of greater artificial light. However, it became apparent that, from every point of view, since these rooms would often have night use, we would have to find a satisfactory system of constant light, not just one that would equalize the illumination in daytime.

An obvious solution to the daytime problem would have been a skylight over the inner third of the room, with incandescent lighting for the remainder, but this would have left a part of the room unlighted at night. On the other hand, all incandescent lighting, when used continuously, we knew to be the most expensive to operate.

Methods and Costs Studied

To investigate the matter further, we began to make a series of studies with the cooperation of the Pacific Gas and Electric Company in order to determine the comparative cost and effectiveness of luminous ceilings versus incandescent and fluorescent lighting combined with daylighting (skylights). In these studies the three methods were identified as *A*, *B*, and *C*. *A* represents luminous ceilings with no daylighting; *B* represents fluorescent lighting in addition to daylighting; *C* represents incandescent lighting plus daylighting.

In this analysis, cost of operating one high school classroom per year has been arrived at by first computing the cost of construction and operation and amortizing them over a period of years.

The expense of installing skylights and the additional cost of skylight brightness control, were important considerations in *B* and *C;* whereas the costs of operation over long periods of time were equally important. The studies indicated a lower construction cost for classroom Type *A* (luminous ceiling) and in addition the total annual cost of operation was favorable. Maintenance costs for this type of structure were also expected to be low.

Ceilings That Light Up

The luminous ceiling as applied here provides high lighting efficiency and has numerous advantages from the point of view of general adaptability. The construction utilizes a corrugated plastic sheeting which is suspended from the roof structure on a steel track and conceals all structural members within the lighting chamber, thereby providing a clean and sleek-looking ceiling for the room. Fluorescent lighting is concealed beneath the plastic, the result being an evenly distributed light which reduces glare and shadow.

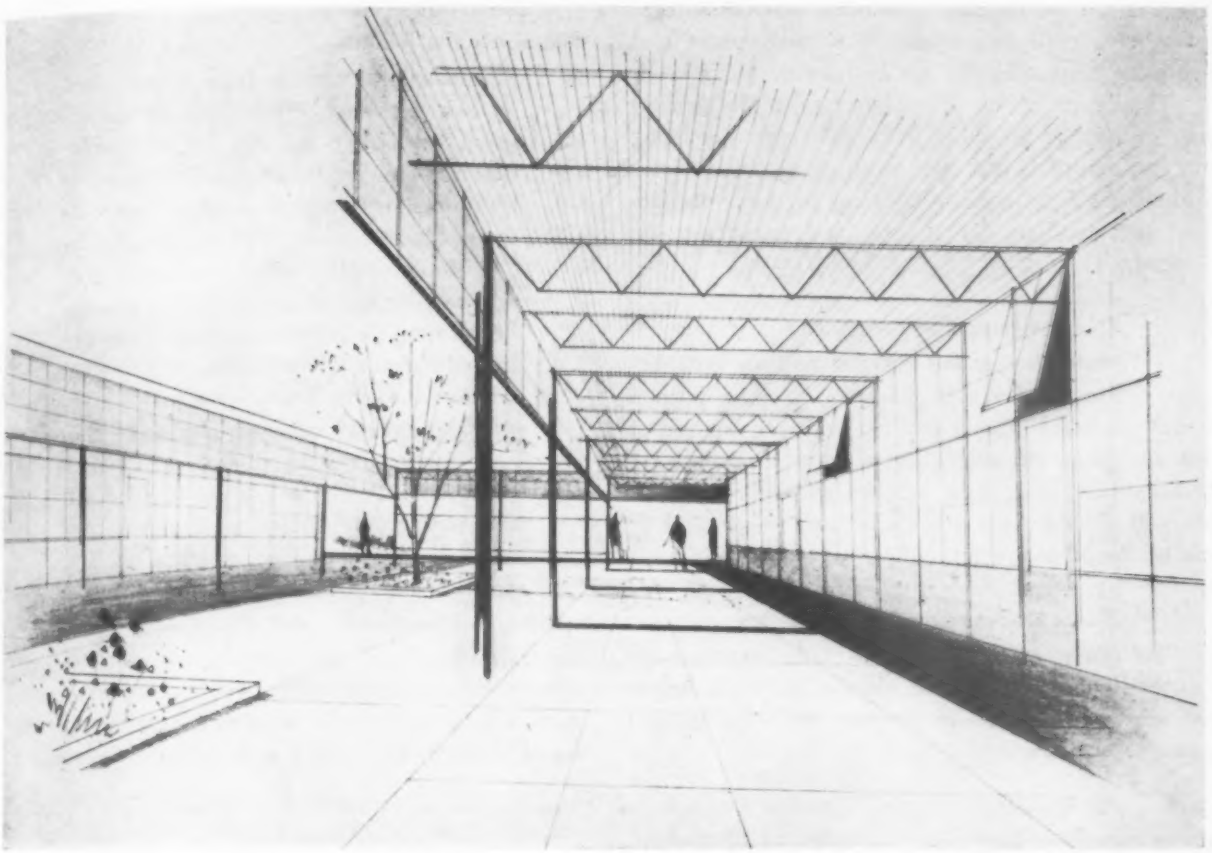
Acoustical members are built into the track which supports the plastic sheeting, combining the light and sound-conditioning in one installation. The use of the luminous ceiling throughout the classroom and laboratory areas is a fresh solution, providing an entire ceiling which lights up with the equivalent of soft daylight.

With this decision made, we could feel that we had a lighting system of guaranteed constancy at all times of the day and year. The window wall would be there for natural reasons, including outside vision with some natural daylight and ventilation. Unit heater-ventilators would provide tempered fresh air when needed, or fresh air.

The Solution Summarized

The wide all-purpose plaza, 200 by 240 feet, is directly inside the main entrance and, while originally introduced as an "outdoor milling area" for students, has now become an attractive, landscaped area which sets off the surrounding buildings more advantageously and separates various zones of activity so that those used by the public are readily accessible.

The administration-library unit is the actual center of the school and can be entered from the plaza or the classroom concourse to which it is connected by a continuous roof. While the administration quarters are



Classroom courts of the De Anza High School consist of airy patios between the wings. The covered passages which surround the courts provide connecting links between the classroom units. Available within the courts are areas for planting and for benches.

necessarily divided into small offices, the library has one continuous luminous ceiling running its entire length and seats approximately 400.

The façade of this unit sets the keynote of the simple, utilitarian appearance preserved throughout the school. Concrete, steel and glass combine in a straightforward exterior in which the emphasis is on light and air.

The entire classroom unit, like the remainder of the school, is on a 4-foot module.

The shops and laboratories comprise a separate unit on a level ten feet above the classroom section and reached by a covered stairway from the end of the main concourse. Certain walls of the shop unit are erected by the tilt-up method. Partitions between the rooms are 3-inch thick wood (tongue and groove), laid vertically and movable if desired for flexibility in use of areas.

A double-loaded corridor runs the length of the unit at right angles to the concourse. Shops are on the far side, laboratories on the near side, as approached from the concourse. The shops have a tri-lateral lighting through use of clerestory windows on the inner wall plus skylights. Laboratories repeat the features of the classrooms. They are illuminated by windows on one side and luminous ceilings. Materials are similar to classrooms.

Boys' and girls' gyms are combined in a single structure, 90 by 220 feet, of steel arch and beam construction with reinforced concrete buttresses. The steel frame supports a 2-inch tongue and groove sheathing plus a one-inch insulation beneath the composition roof. The boys' gym is large, with movable bleachers accommodating 1,800–2,000 persons. With the adjoining boys' and girls' locker areas (reinforced concrete with concrete roof) the gym unit forms a U-shaped pattern providing for the inclusion, at a later date, of a swimming pool which can be roofed over by steel arches and a translucent covering. Natural overhead light is provided throughout the whole gymnasium-locker unit by skylights.

Cafetorium Unit

Cafetorium, music and little theatre unit is located for direct access from the plaza and the classroom-shop area. The cafetorium, as its name implies, is a multi-purpose room serving as a cafeteria, small auditorium, social room, etc. As a cafeteria, it will seat 500 at meals. It is well adapted to dancing and other social uses requiring a level floor, and with the port-

able platform can be used for student assemblies, dramatics, etc., until such time as the little theatre and eventually the auditorium are completed.

The design of the cafetorium repeats the general characteristics of the other units, the front wall being principally of glass and steel, with clerestory windows on the opposite side. A small dining room for the faculty, with outdoor dining area, and snack bar are included.

Covered Outdoor Area

A feature here is the covered outdoor area between the cafetorium and classroom block. A portion of this patio-like area is covered with an expanse of heat and glare reducing glass, making it possible for students who bring their lunches and others to use this part of the patio when excessive heat, wind or rain would otherwise prevent.

Music Rooms and Little Theatre

The three music rooms and little theatre have unbroken concrete walls, the exterior having a simple and clean appearance in keeping with the general character of the school.

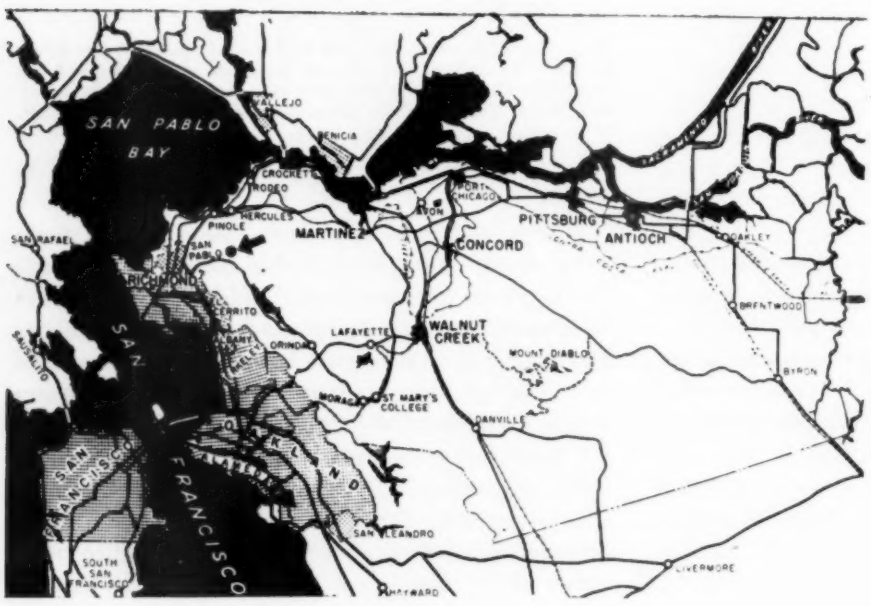
The resultant design, viewed as a total plan, accomplishes the following:

It will provide a high school plant which can readily become both the educational and social center of a new community which is growing up around the school. It is also designed to grow in accordance with the needs and resources of the community.

While meeting all requirements as to size and variety of facilities, it is also coherent from the point of view of function, in the administrative and educational sense, while at the same time allowing ease of access and circulation for the public.

Compactness in design of building units provides economy in use of space and materials, also reserving the desired amount of outdoor space for sports and recreation.

Although the various functions have been separated into zones of use, all buildings and all units are laced together by covered passages. At the same time, there is liberal open space, even between the classroom wings, to allow the units to breathe and the students to enjoy space, light and air between classes.



Map of the San Francisco Bay Area. Arrow shows location of the new De Anza High School which is within the Richmond Union High School District.

EDSEL FORD MEMORIAL LIBRARY AT HOTCHKISS SCHOOL IN CONNECTICUT



by GEORGE VAN SANTVOORD

Headmaster, Hotchkiss School, Lakeville, Connecticut

Mr. Van Santvoord has been headmaster at Hotchkiss School since 1926. He graduated from Yale University in 1912 and was a Rhodes Scholar at Oriel College, Oxford, B.A., 1915. He served as ambulance driver with the French and in the U.S. Infantry during World War I and holds the Croix de Guerre. Mr. Van Santvoord taught at Winchester College, England, at Yale and at the University of Buffalo before becoming headmaster of Hotchkiss.

THE Edsel Ford Memorial Library at the Hotchkiss School, Lakeville, Connecticut, was designed by the firm of Delano and Aldrich, New York City, and was dedicated in the summer of 1952. The library was made possible by a gift of $350,000 from Mrs. Edsel Ford and her three sons who are graduates of the school.

The new library is a building of considerable distinction, but it is also an example of successful planning by an architect who had to design a new unit to harmonize aesthetically and functionally with a group of buildings already in existence. The Hotchkiss School thus deserves the attention of anyone interested in architectural developments in America during the past 60 years.

Corridor Connected Old Buildings

The original buildings, designed by Bruce Price and erected in 1891–92, were provided with a most useful and functional device—a wide corridor, 325 feet long with windows on the south side, connecting all the buildings. At its center was a four-story structure of yellow brick with offices and library on the first floor and dormitory rooms for boys and masters above. Along the corridor to the left were classrooms and study-hall; to the right were the chapel, dining room and gymnasium. Several detached cottages were allotted to married masters. All foundations were of native limestone; the structures themselves except for the main building were of timber covered with stucco.

About 1920 Cass Gilbert made a careful study of the site and buildings and, under his direction, two new dormitories were built to house 140 boys and 8 masters, together with an infirmary for 40 patients. These buildings were of steel and concrete construction, red brick with white marble watertable and sills, and in the Georgian style.

Architects Carry On Changes

In 1930 Delano and Aldrich were engaged by the school trustees to serve as architects. Their work is represented at Hotchkiss by six buildings: the chapel, two dormitories for about 120 boys, the gymnasium, the dining room, finished in 1948, and the library, completed in 1952. The replacement and reconstruction of all original buildings is now almost completed. In about 30 years nine new buildings have been put up to replace obsolescent structures. Two or three more are envisaged to complete modernization of the whole plant.

In planning the library student circulation to and from the various buildings was studied carefully. A corridor was designed to pass through the north end of the building to the dining room lobby. Large windows opening to the north give abundant light. Between the windows is placed a tablet in memory of Edsel Ford.

Opposite this tablet a flight of steps ascends to the library. On either side are steps leading down to a hall eight feet wide, flanked on either side by three classrooms. Classroom interior walls are of cinder block; rubber tile covers the floors; the ceilings are



The Studio Shop

Third floor art studio of the Edsel Ford Library. Slots in the wall are for storing canvasses. Boys' art work is shown on board.



Reading tables and library alcoves of the library. There are five alcoves on each side. Floor is rubber tile and bookcases are oak. Windows of each alcove contain letters which serve as guides to the books in each section.

soundproofed and lighting is eggcrate fluorescent. At the suggestion of masters, each classroom has a variety of novel features; a glass-fronted cabinet for exhibits of books, manuscripts or other items, a lighted shelf for dictionaries and other reference works, a large cork board for pinning up pictures and notes, a small bookcase, shelves and drawers for storage and two large steel filing cabinets built into the wall.

Experiments were tried in providing chairs and desks. Some rooms have small tables and chairs, others are furnished with tablet-armed chairs. Two rooms accommodate 16 pupils; three rooms have places for 20 or 22 boys. One room has a closet for motion picture apparatus and chairs for 40 boys. Films, film strips, etc. are shown here.

The library proper occupies the south end of the second floor. On entering, one has the librarian's desk on the left with a doorway leading to her office. On the right is the catalogue cabinet. The floor is rubber tile of dark green, harmonizing with three large chan-

deliers hanging from the arched ceiling. Ten large tables occupy the central space. Four of these are round, the others oblong. New books are displayed in racks on the tables nearest the entrance. There are seats for 90 readers. The room measures 45 by 72 feet.

Five large windows are in the side walls, each lighting an alcove made by the bookcases. Each alcove is 10 by 10 feet. A large letter on the central pane of each window designates the alcove and its contents. Magazines of general interest are placed on the tables nearest the entrance. Others are placed on a shelf in the appropriate alcove. A large window at the south end of the room lets in light and sunshine, and on all sides there are pleasant prospects of trees and lawns with members of the school community passing to and fro along the paths.

Lighting System

All lighting fixtures are in the ceilings—none on desks or tables. Officials in other libraries have agreed that fixtures fastened to tables are difficult to clean and inevitably subject to tampering. The alcoves are lighted from above. The reader has only to press a button to turn the lights on. The whole lighting system is controlled by a switchboard in the librarian's office. Heat is provided under the window sills, and comes from the school's central steam plant. Ventilation is provided by ducts opening around the chandeliers.

The bookcases and other woodwork are of white oak, waxed and polished. Plaster walls above the oak panels are painted Pompeian red and the curtains are of sand color. About 12,000 volumes can be shelved in the library. An adjacent room, 21 by 27 feet in the northeast corner of the building, is used for stacks and will accommodate about 12,000 additional volumes. This room is provided with steel cases, a large table for processing and repairing books and shelves for filing periodicals.

Other rooms on this floor are the librarian's office, toilets for men and for women, a small darkroom with metal safes for storing books and papers of special interest and value, and a music room.

Library Music Room

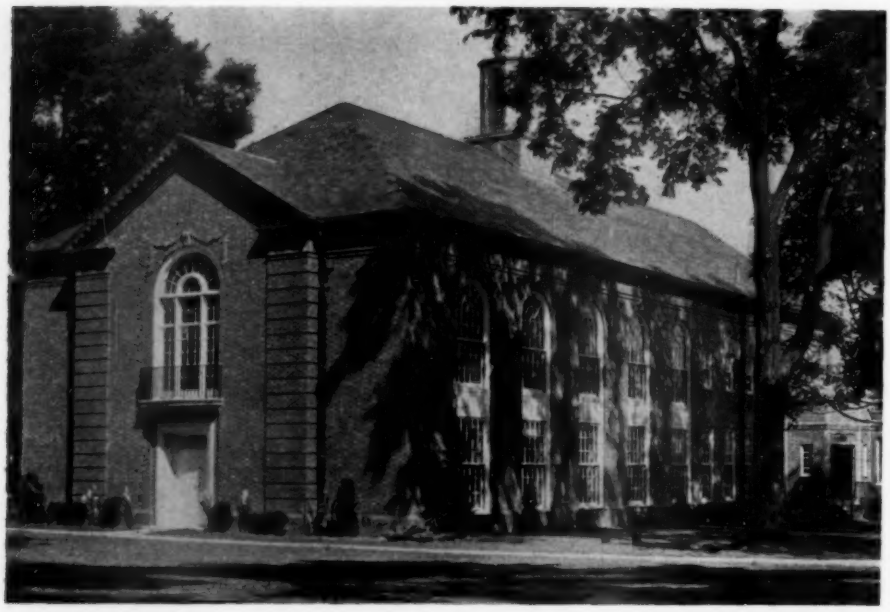
The library music room contains a rapidly-growing collection of phonograph records. Its nucleus was a splendid set of recordings of classical music presented some years ago by the Carnegie Corporation. To these have been added many long-playing records. A piano, easy chairs, a long table with captain's chairs and a fine instrument for playing the records complete the furnishing of the room. Boys and other members of the school community may use it at will. The music room measures 19 by 24 feet.

Finally, a visitor to the library must climb to the third floor to see an art studio which has brought joy to the hearts of the steadily increasing number of boys interested in painting and drawing. Instruction in art was first provided at Hotchkiss in 1928 by Robert Osborn. He stimulated great interest in the subject not only in the classroom but with imaginative displays in the main corridor. These weekly exhibits were of painting, architecture, sculpture, photography, cartoons and all sorts of material from everyday life. His successor, Thomas P. Blagden, has continued to develop and expand these activities, and the new studio was planned and laid out by him. It is 37 feet square. About 100 boys now make some use of the art studio.

Starting in the basement of the headmaster's house in 1928, art moved into a ground floor room of a dormitory and in 1952 ascended into its new home in the Ford Library. A north wall completely of glass gives splendid light and a magnificent view of the forested hills and mountains across the Massachusetts border. There is a commodious store room for supplies. The whole south wall serves as a great display area for work of the great artists of the world and their would-be rivals at Hotchkiss. Cabinets line the east and west walls. This room is in constant use and is one



South facade of the library. On the left is the old corridor designed by Bruce Price in 1891 to connect the main group of buildings. There is a moulded brick trim at the cornice and around the eaves of the building.



Southeast view of the library at Hotchkiss School. The corridor at the right leads to the dining room.

of the most highly prized facilities of the new Ford library building.

Exterior Features of Library

The exterior of the building is a replica of the chapel, both designed by Henry Waterbury. It is of red brick, with an elaborate cornice of moulded brick and a small gable at the south end. It is 110 feet long, 48 feet wide, 28 feet to the eaves and 44 to the ridgepole. Five large windows on each side recall the fenestration of New England churches of the eighteenth century, with wood panels separating windows of the first floor classrooms from those of the library above. The roof is of rough slate, and is surmounted by a cupola coated with lead. Floors of corridors and lobby are terrazzo. All rooms are floored with rubber tile.

Contractors for the Edsel Ford Memorial Library were the Stuart Company of New York, a firm which had already put up six buildings for the school. Much of the labor came from the township of Salisbury, including Mike Flinn, the timekeeper. His father helped build the original school buildings, and he himself has worked for the school on all new construction for the past 30 years. Several Hotchkiss boys now at college served as laborers during their summer vacations.

To any group, family or institution a new building is an obvious source of pride and joy. Every student and teacher feels a keener enthusiasm in his work and play and a quickening of his loyalty when he finds that the needs of his institution are recognized and met so generously by others. The new library at Hotchkiss has exceeded all hopes by the response it has brought. New books, periodicals and phonograph records have poured in, interest in reading and study has mounted steadily, eagerness to help in the administration and care of the building and its collections has been shown on every side. Altogether it has been the most exciting event in the school's history.

Architect Planned for Beauty

Hotchkiss School's debt to its architect is incalculable. Delano and Aldrich have served well for 25 years and, in particular, the late Mr. Henry S. Waterbury will be remembered with gratitude and affection. His success in his work at Hotchkiss came from his readiness to spend much time at the school so that he came to know and respect not only its aims and ideals, but its daily and hourly routine. He was insistent that the buildings be gracious and beautiful. But he knew too that architecture is the handmaid to life, and no labor was too great to ensure that his building provide the exact function it was to serve.

The chapel was perhaps his favorite building, but all prize the Ford Library as his final handiwork. He completed the design and supervised the construction, but his last visit occurred just before the workmen had finished their task and before the final touches were complete. As an artist Mr. Waterbury took great joy in creating a beautiful building, and he was delighted at the remark of an old man fitting together the oak panelling: "This is tough work. It all has to be done just right. I get impatient, but am glad to do it, for I probably won't ever again have a job like this to do. When you finish, you can be proud of your work and know that it will last for centuries."

Mr. Waterbury's buildings at Hotchkiss may be expected to stand as permanent memorials of his professional skill and devotion to Hotchkiss school.

PHILLIPS ACADEMY'S WAR MEMORIAL GYMNASIUM



by FREDERIC A. STOTT

Director of Public Relations, Phillips Academy, Andover, Massachusetts

Mr. Stott graduated from Phillips Academy in 1936 and from Amherst College, A.B., in 1940. He was a captain in the U.S. Marine Corps from 1942 to 1946. His military service with the Pacific 4th Division included action on Kwajalein, Saipan, Tinian and Iwo Jima. After the war Mr. Stott did promotional work in 1946 for the Republican Party and sales work for the leather industry in Los Angeles and New York from 1947 until 1951. At that time he joined Phillips Academy as public relations director.

THE new Memorial Gymnasium at Phillips Academy, Andover, Massachusetts, is the direct result of some hardheaded "then and now" comparisons. "Then" was the year 1902 when a new gymnasium was hailed for its ability to fulfill the athletic needs for a student body of 380. "Then" was an era when the role of athletics and physical education focused almost completely on those with skill and interest. Compulsory athletics was an innovation. It was an era when indoor winter physical education included the swinging of Indian clubs, limited basketball and swimming and little else.

By 1952 Andover students totalled 739. While the enrollment had doubled, belief in athletics for all had become the pivot post of the school's physical education program. Moreover, the range of sports played by Americans in winter had greatly enlarged. A new gymnasium was clearly essential, and no better memorial could honor the 143 alumni who lost their lives in World War II.

Alumni, parents and even students joined the fund-raising activities, for the project was to cost $1,195,000. New York architects Eggers and Higgins were handed the task of designing a building which would care for the needs of all 739 boys, which would utilize the existing facilities of the 50-year-old Borden Gym, and whose external appearance would harmonize with the Georgian style of architecture prevalent on the Phillips Academy campus.

Many Activities Available

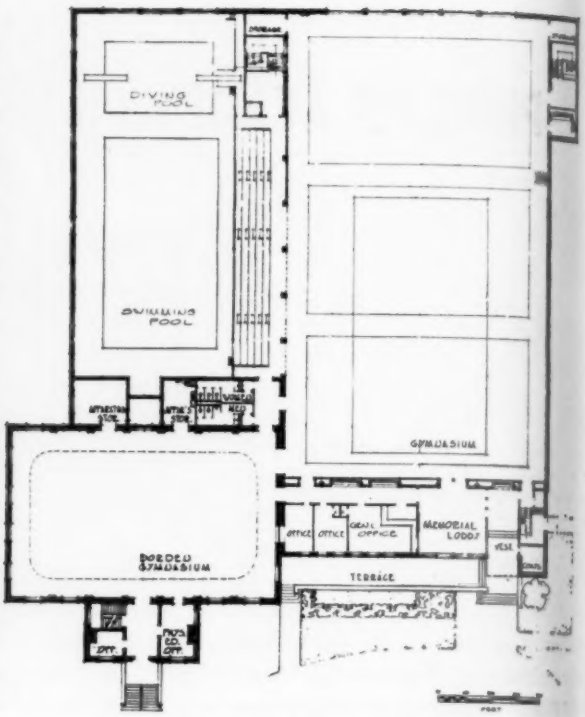
One full year of operation has confirmed the wisdom of the design. In the past year the school's 739 boys were easily handled during the winter months with the gymnasium making possible for each boy activities of basketball, swimming, wrestling, boxing, squash and special exercise, in addition to hockey, in-



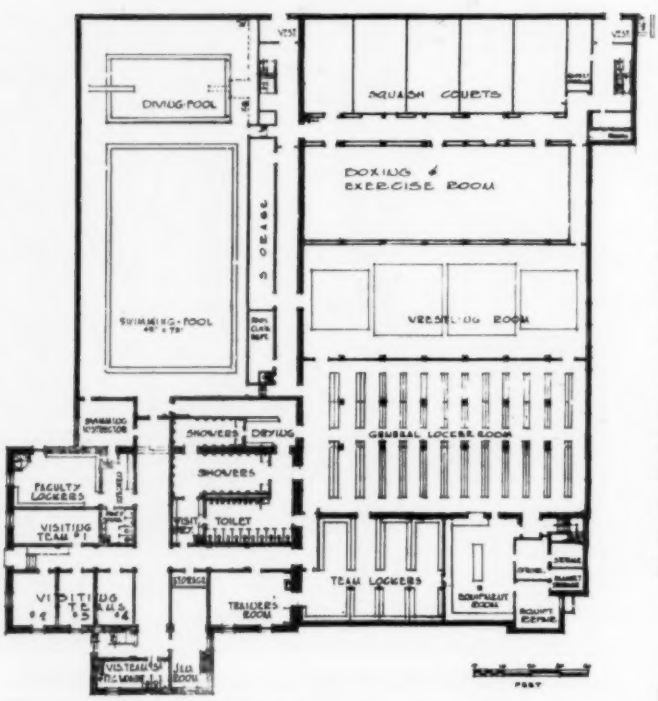
In the early winter days of 1952 the skeleton of the gymnasium was beginning to rise. The basic structural steel is in place. At the rear left is the area which is now occupied by the swimming pool. Oliver Wendell Holmes Library



Scaffolding is in place at the far end of the diving pool-to-be. Work progressed despite the snow and cold.



Main floor plan of the Memorial Gymnasium. Swimming and diving activities take place in separate pools.



Ground floor plan. There are provisions for 684 full size and 132 oversize lockers. There are separate wrestling and boxing rooms.

door track and skiing performed elsewhere but dressed for in the building.

Two parts of the building have attracted the greatest amount of visitor interest—the swimming and diving pools, and the mammoth main floor for basketball. Swimming and diving are given separate pools to the great benefit of each type of aquatic activity. Measuring 42 feet by 75 feet, the swimming pool ranges from 4 feet to 6 feet in depth. Its width allows six championship lanes for either free style (where a 4-foot lane is required) or breaststroke (which needs 7-foot lanes). This swimming pool represents an enlargement of the former four-lane pool which had been constructed in 1902 and in which an impressive list of records had been set. None the less, in the first year of competition in the new pool practically every record was erased. A leading reason for the faster times is that the inset gutters on all sides reduce excess wave action. Coaching technique is aided by an underwater observation window, measuring 42 inches by 24 inches, through which coaches diagnose swimming faults and then relay this diagnosis at once by hookup with the loudspeaker system.

Separate Pool for Diving

Even more unusual in American indoor swimming is the separation of diving from swimming. For the dual reasons of increased safety and a greater degree of participation, a separate diving pool was built with



Swimming pools of the gymnasium. The diving pool has a safety depth of 11½ feet and has both one-meter and three-meter boards. The swimming pool has six lanes and an underwater window aids coaches in observing the students.



Main floor. Folding doors can be seen at extreme right and left. Folding bleachers are at the left. Designed by architects Eggers and Higgins, the new gymnasium was constructed by Edmund J. Rappoli Company, Inc., contractors.

Haskell

both one-meter and three-meter boards. This pool measures 40 feet by 25 feet, has safety depths ranging between 11 feet and 12 feet and conforms with all AAU and NCAA regulations. Recognizing the wide range of weights in boys 14 to 18 years old, both boards are provided with adjustable fulcrums.

The tiled decks around both pools are warmed by radiant heating equipment built into the decks, and the desired constant temperatures of 80 to 84 degrees for daily practice are maintained despite outside weather. A soft green wall color, recessed lighting fixtures in the ceiling and ten window panels placed high on the walls cut reflection from the water's surface. Made of glass block, these panels also reduce heat loss and condensation.

Spectators are cared for in permanent seats ranging along one side of the swimming pool. Normal capacity is 270, but for special attractions this can be doubled by raising a metal screen door and reversing the sliding bleachers from the adjacent gymnasium.



Four key figures at laying of the building cornerstone. From left: A. Murray Preston (Lt. Cmdr. USNR); Commander R. H. O'Kane, USN; Fleet Admiral William F. Halsey, Jr., USN; Headmaster John M. Kemper of Phillips Academy.

Three Basketball Courts

The main floor of the gymnasium points out clearly the comparison with 50 years ago. This floor measures 165 feet in length and 102 feet in width, contrasted with the old Borden Gym's main floor which runs 100 feet by 60 feet. Whereas the Borden floor could barely accommodate a single basketball court, the new floor divides into three full-size parallel courts. For varsity games the direction of play is reversed to cut across two of these courts, baskets are lowered from their suspended positions in the ceiling, and a metal folding door comes out from the wall to seal off the third court. Twelve hundred spectators can be accommodated by two sets of folding bleachers which are lowered from the side walls.

One gauge of the effectiveness of four courts is that a total of 175 boys signed up for basketball, were divided into fourteen different teams, and then proceeded to use these courts for at least an hour per team per day. An extra usage dividend is the availability of this big floor for mass events such as the annual Alumni Luncheon which in 1953 seated 1,700, or the sports clinic course in the Andover adult education program which attracted 1,800 from towns in the nearby area. At such times floor protection is afforded by a giant cover made out of 72-inch wide strips of heavyweight duck taped together.

Beneath this expanse of western hard maple are the less impressive but equally vital quarters which make the physical education program work. A large



The gymnasium also serves other functions. Alumni Luncheon is held here annually.



Full view of the rear of the Memorial Gymnasium. The main gymnasium is on the left, swimming and diving pools are located at the right. There are 251,000 bricks in the building walls; the main gym floor required 16,500 square feet of select western hard maple; and 237 gallons of paint were consumed for the building which has limited wood surface. On the construction job were 230 workmen representing 22 different subcontractors as well as the chief contractor.

locker room holds 684 full size lockers, while 132 oversized lockers for varsity teams are included in a section adjacent to the large room. All lockers are ventilated by pulling dry air through the lockers into an exhaust duct.

Additional Space Provisions

Five squash courts, a boxing and special exercise room and a spacious wrestling room, complete with plastic covered padding on the entire floor and to shoulder height on the walls, comprise the additional athletic facilities on this level. For storage, distribution and repair of the many different types of athletic equipment a sizable stock room is located adjacent to the locker rooms. Visiting teams also fare well, for the new structure has freed several rooms in the basement of the Borden Gym which have been adapted to this end. Ample proof came at the New England Interscholastic swimming meet in March, 1953, when 12 prep schools and over 30 high schools entered the two-day event.

At the dedication exercises held in 1953 Headmaster John M. Kemper said:

> No small part of the education of boys is the development of physical and sports skills; of physical strength, stamina and

coordination; of the ability to swim and the knack of swinging a racket. Some come to school never having learned to throw or catch a ball. Individual skill means confidence in self. To self-confidence can then be added the further benefits of team-play and competition.

In a school of 739 boys, the planning and administration of an athletic program for *each* boy is a complex problem. The foundation of such a program is requisite space and equipment. Generally, our fields have been adequate. Not so our gymnasium.

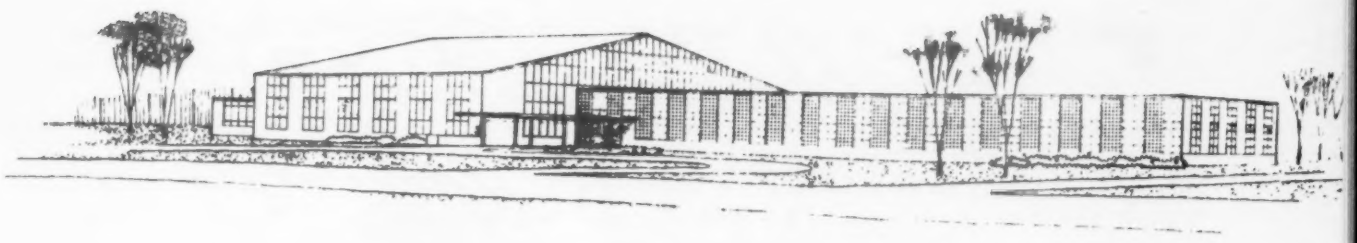
> Now in our 175th year, this pressing want has been removed. . . . Any . . . winter afternoon will show 500 boys engaged in 9 different sports. For each can select according to his talent and desire. And the untalented, no longer relegated to the back row, now have full chance to discover enjoyment and perhaps unknown skill.

This statement well sums up the role of physical education and of the new Memorial Gymnasium at Phillips Academy.

Haskel



The much traveled path leading from the rear of the gymnasium building is the connecting link between the field house and artificial hockey rink. Neither of these can be seen but they are less than fifty yards from the door.



SOUTH PEORIA BUILDS A HIGH SCHOOL

by CARTER E. HEWITT

Partner, Hewitt & Bastian, Architects, Peoria, Illinois



Mr. Hewitt is a graduate of the Princeton University School of Architecture. He was an officer in the Corps of Engineers during World War II. Mr. Hewitt is a member of the American Institute of Architects and the Society of American Military Engineers.

and L. D. MURRAY

Principal, Community High School District 310, Peoria, Illinois



Mr. Murray received his B.S. degree from Illinois State Normal University and his M.S. from the University of Illinois. His experience has included that of teacher, coach, principal and superintendent of schools. Mr. Murray was a member of the Naval Air Reserve during World War II.

GREATER Peoria is a community of 250,000 population divided by the beautiful Illinois River into East Peoria, a heavy manufacturing area, the city of Peoria on the west bank and numerous satellite communities. The population of the city of Peoria at the last census was 111,856. The city itself grows slowly but Greater Peoria has increased 40 percent in a decade. The river is a county division, and we shall therefore be concerned only with the city of Peoria and its satellites on the western side of the river.

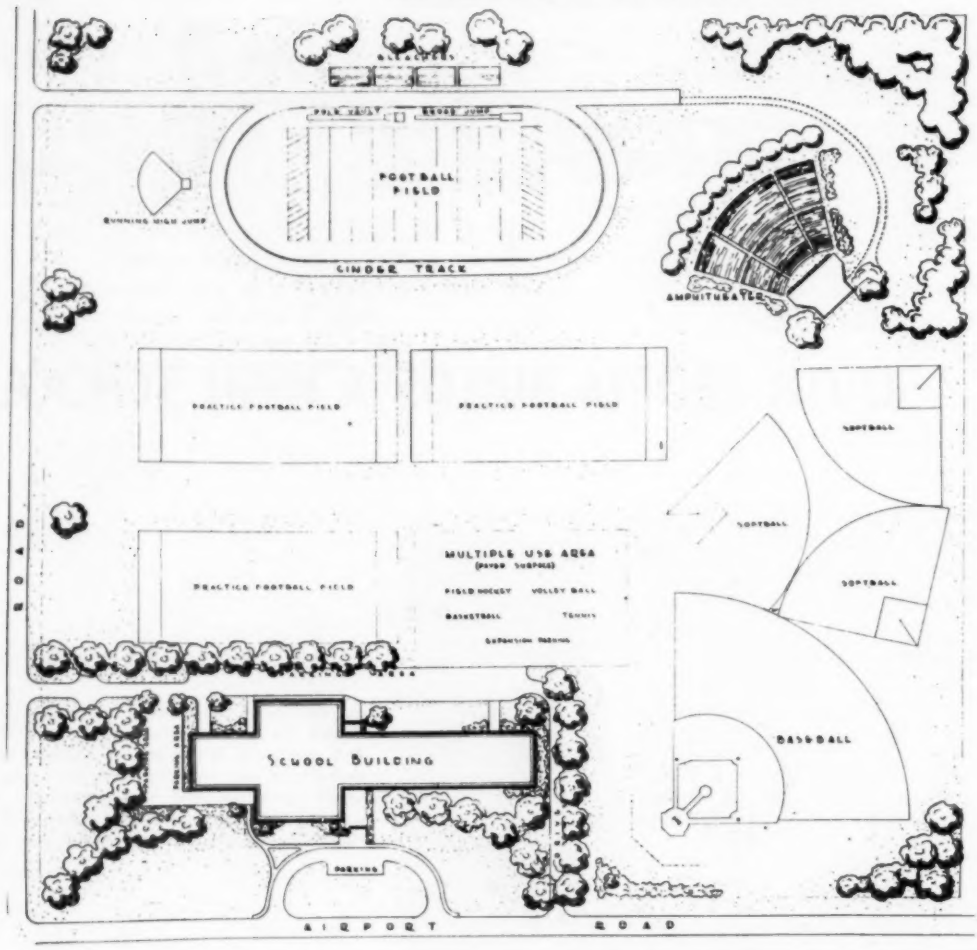
Peoria's school system operates under an ancient special charter which is thought to have many advantages, such as the right to buy and sell real estate without the approval of the voters; but the charter strictly limits the district's operations to the township of Peoria. Except for one or two small areas the city and the township are coextensive. Thus, as the Greater Peoria community grew, the school system could keep up only when the newly developed areas agreed to annexation with the city. One sizable adjoining area did agree to annexation in 1927 but recent annexations have been relatively insignificant.

Since the city was the focus for cultural and educational activities, surrounding areas were organized into a "non-high district," covering a surrounding swath from the river on the north to the river on the south. The exterior boundaries were formed by high school districts serving the agricultural areas and small towns. The suburban dwellers' children from the non-high district were sent into Peoria on tuition, and this tuition was paid out of taxes by the non-high district.

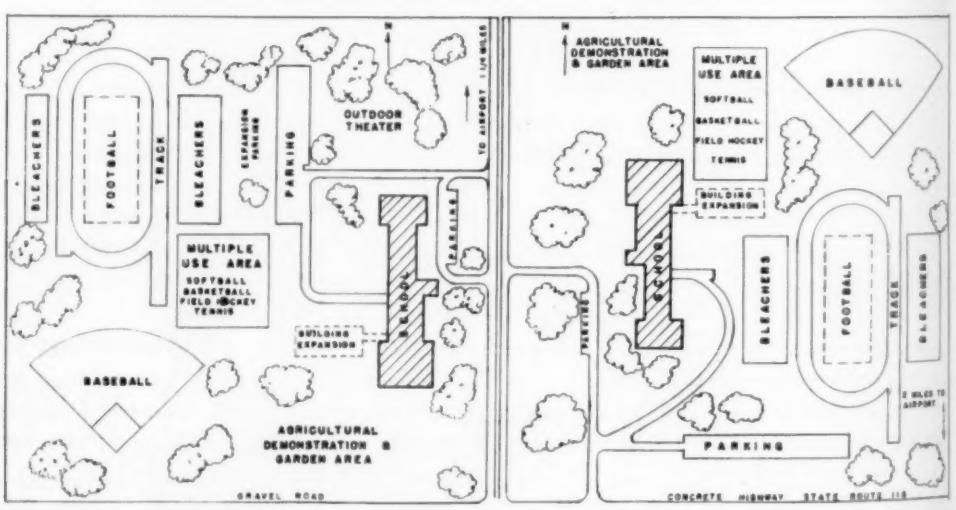
Voters Refuse to Raise Taxes

Possibly because they had no voice in or control of Peoria's educational system, the non-high voters repeatedly refused to raise the tax rate to meet the mounting cost of tuition. The non-high District Board then sold bonds to meet the deficit without approval of the voters. Technically the voters could object, but in practice they did not, because of the physical difficulties of preparing and processing the required petitions. In this way the non-high district went deeper and deeper into debt while the Peoria tuition rate soared higher year by year. In 1942–43 it was $150. By 1949–50 it was $315.

In 1948 a County Survey Committee acting under a new state law recommended that the non-high area be divided and reorganized into two separate com-



General development plan for the community high school for Limestone Township, Hewitt and Bastian, architects, Scruggs and Hammond, planning consultants.



Alternate site plans shown at right were presented to the people of the school district in the High School Survey Report. The merits of each site were fully discussed.

munity high school districts, each with its own school facilities.

Acting on this recommendation, the voters in the southern portion of the old non-high district organized and voted in a new community high school district on February 5, 1949, and in due course elected a five-man Board of Education to govern the affairs of the district.

The area described included the community of Bartonville, home of the Keystone Steel and Wire plant, the community of Bellevue, a residential area, and in the center, the Greater Peoria Municipal Airport. West of the airport the water supply is severely limited. Eastward the land falls rapidly to the river and is fully developed. Thus it soon became apparent that the high school must be located near Bellevue on the north or near Bartonville on the south. There was no satisfactory compromise.

The new Board was composed largely of men living near or in Bellevue. Most of the members had

little experience in school board activities, and none in high school organization. They hired a lawyer and cast about for some way to have factual data about the district organized and presented to the taxpayers.

Site Selection Controversy

The Board was faced with a serious and growing altercation over site selection. They invited suggestions from our office, and after some discussion it was decided to find one suitable site in each of the two areas and let the decision be made by popular vote in accordance with Illinois law and sound democratic procedure. It was further decided to hold a bond election at the same time as the site election, otherwise those disappointed over the site might kill the bond election. Actually, as later studies indicated clearly, the travel time difference between the two sites for any given student was negligible regardless of the outcome; but the issue was human, real and at times warmly argued from the standpoint of community pride. It was therefore dangerous to the well being of the new district.

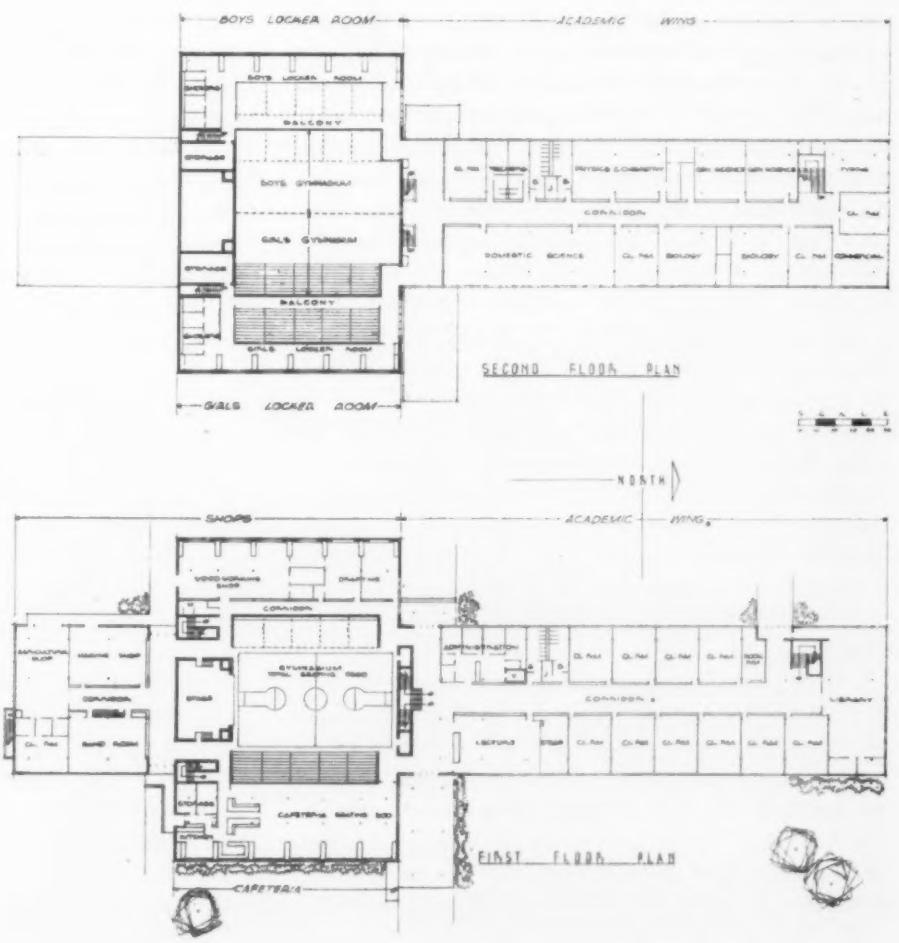
The Board then requested our office to prepare an outline for a survey of all factors pertinent to the development of the district. It was their idea that the survey should be designed to convey information to the taxpayer in a form which would be easy to understand.

The outline of this activity was prepared and presented at a public meeting with surprising results. Several citizens arose to say that this was the first time they had ever seen school affairs handled in an intelligent business-like manner. Others welcomed the opportunity of being informed about their school problems. The cost of preparing the survey was stated frankly and amounted to a considerable sum, but it was hoped this could be covered by an advance from the Bureau of Community Facilities, as indeed it was.

The survey was authorized as a result of this enthusiastic public meeting, and when completed was distributed in volume through pupils in the grade schools, through markets and stores and wherever people congregated. Many people still have their copies and refer to them as the district progresses.

Architects Coordinate Survey

Our part in the survey was largely coordination of the advice and contributions of many specialists, and editorial work in making their comments understandable to the layman. The survey was directed entirely to the harried taxpayer, and in this it departed entirely from the verbose and technical surveys we had



First and second floor plans of the community high school. The building is divided into three main areas —a shop wing, a gymnasium-auditorium and an academic wing.



Associated Photographer

Lifting slab section of 5,200 square feet. Jacks visible on top of columns pull the slabs up by means of threaded lift rods. Bushings at lower ends of these rods are seated in heavy cast steel collars poured in the slabs. After raising, the slab collars are welded to columns and additional angle supports are welded in place to transmit loads to columns.

seen which gave us the impression that the reader was eavesdropping on a monologue delivered by one school expert for the edification of another school expert. We wanted to explain what was needed, what it would cost, what it would do. We wanted the approval of informed taxpayers, which we conceived was the foundation of all systems of public education.

First, we asked the county superintendent and the College of Education of the University of Illinois to advise with relation to curriculum problems. Mr. J. L. Landes of the University of Illinois and Mr. Earl Downing, county superintendent, met with the Board. As a result of the meeting Mr. Landes wrote a letter outlining specific curriculum objectives. Copies of this letter were mimeographed and made available to all interested on request to Board members. Excerpts from the letter were quoted in the survey, and the recommendations, after acceptance by the Board, became the basis for our work.

Next we secured the assistance of Mr. Charles M. Greeley whose experience includes the operation of several high schools as principal, and who has gone through several building programs. His advice and interpretation of the curriculum in terms of space requirements and teaching staff was invaluable, and formed the program for design of the building and grounds.

Our mechanical engineering consultant, S. Alan Baird, investigated water supply, sanitary services and power requirement problems at various proposed sites while Scruggs and Hammond, landscape architects and site planners, assisted in appraisal of overall area planning problems, site selection and site utilization. David L. Keith, public relations counselor who advised with reference to the clarity of the material presented, helped to develop the basic approach.

Two Sites Chosen

Site committees were appointed and two good sites were selected, one north of the 521-acre airport, one south, each containing 40 acres of generally level land. An election was called after a series of public meetings at which those attending showed clearly by their questions and comments that the survey had been read and absorbed. After this thorough preparation a bond issue for a little more than one million dollars was proposed and site ballots prepared. Interest in the site selection ran high, and the Board advised voters to be sure to vote for the bond issue, otherwise there would be no high school.

The result on June 17, 1950, was a landslide. Over 3,000 approved; 120 opposed. The Board prepared to sell the bonds, but ran into legal difficulties concerning certain irregularities in the original formation of the district. In order to cure these defects it was necessary to secure passage of a special enabling act in the State Legislature, and then test the validating act in the State Supreme Court.

This legal program occupied nearly two years, during which time the Board tried repeatedly without success to obtain advance planning funds from the Bureau of Community Facilities.

In this way the entire program ground to a halt after a most propitious start. No explanation could be given to the public lest taxpayers withhold taxes from the doubtful district. Board members were therefore greatly relieved when they learned early in the spring of 1952, that the district was finally validated and the bonds could be sold.

Building Plans Proceed

The Board swung into action, selected the new principal, Mr. L. D. Murray, and directed us to proceed immediately with plans for a building to be completed for opening in the autumn of 1953. Provision for adequate space allotments to handle the various aspects of the educational program was of prime importance. These allotments were determined by a consideration of current enrollment trends, the assessed valuation, by many visitations to other schools, conferences with school administrators and recommendations from the various supervisors within the State Department of Public Instruction. With these requirements we proceeded with preliminary plans and cost estimates. As a result, the Board was faced with a serious decision.

The outline plans prepared for the survey contemplated an initial enrollment of 550 pupils, with

provisions for ultimate expansion to provide for 900 pupils. The two year delay, however, had done two things: it increased the probable initial enrollment to about 750 students, and it increased the bonding capacity of the district by about $280,000 over the original ceiling.

We therefore asked the Board whether we should plan a complete but inadequate building within the original budget of $1,000,000, or build for 900 pupils and ask the public for an additional bond issue. The Board elected the latter course and, after receipt of bids on October 21, 1952, began a campaign for the necessary funds for equipment. In February, 1953, with the building under construction, the second bond election passed by a margin better than two to one.

Second Bond Issue Success

One reason for the success of the second bond issue was that the low bid received on October 21, 1952, totalled $1,045,000 against our estimated cost of $1,055,000. Another reason was that the great steel trusses for the gymnasium unit were ordered in advance from the Luria Engineering Corporation and were on the job site the day the general contractor went to work. This procedure was followed because, as a result of the Korean War, structural steel was on priority and there was some doubt as to delivery. The great trusses, spanning 160 feet clear, were classified as standard and therefore were not subject to priorities and could be obtained without priority rating.

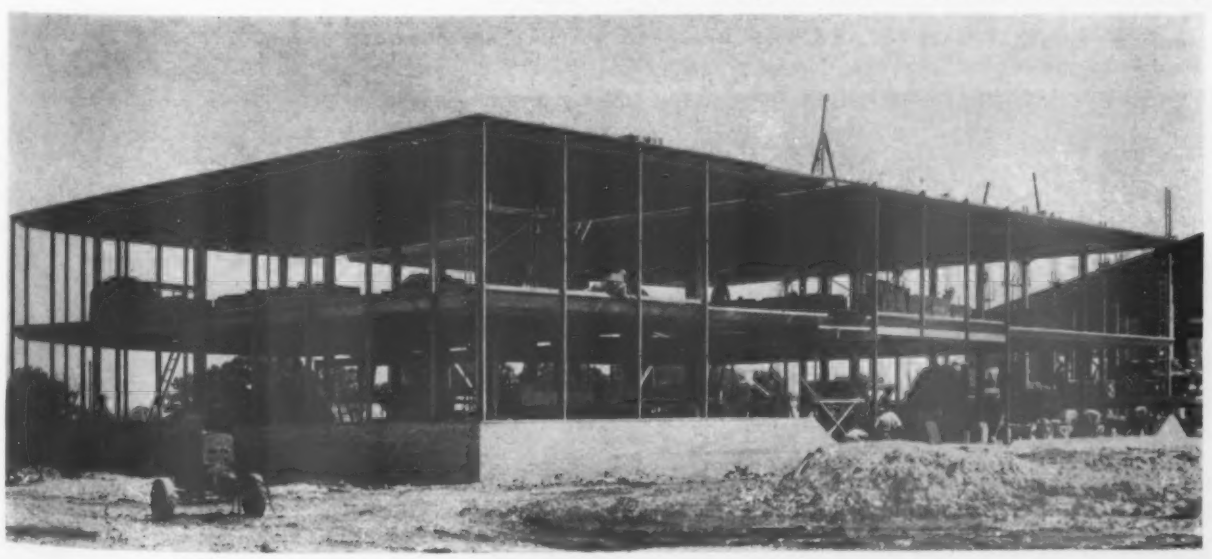
The planning of this project involved calculation of several important factors not usually given much attention in school planning. Room arrangement was determined by consideration of the basic principles involved. All science laboratories and home economics and commercial areas were placed on the second floor of the academic wing to isolate odors or noises produced by these departments. Standard classrooms were placed to allow for expansion in any one of these various divisions. All academic classes were situated on the first floor, along with library facilities. Shops, locker rooms and cafeteria were located in the gym and shop wing sections, thus separating academic from shop areas as far as possible so as to minimize noise interference.

Process of Selecting Equipment

Selection of classroom, shop and laboratory equipment for the new building became one of the major projects for Mr. Murray. This was handled by many visitations, conferences with schoolmen and examination of various manufacturers' products. With this background of information selection of the best types was made. Bids were called for by specifying the type of items which most nearly met the criterion of price and utility. Speed of planning and construction were the prime factors, and selection of furniture cabinets, etc. naturally had to be fitted into the overall building plan. The use of false floors in the laboratory areas made it possible to select the furniture and then plan the arrangement of various facilities after selection.

As a result of selecting furniture after the overall planning of the building had been completed, it was necessary to make various additions and deductions to fit in all available equipment. These changes added about $30,000 and brought the final cost to $11.48 per square foot. Compared to $10.75 estimated in the survey two years earlier, these costs have met with general approval. The building is a completely fire-resistant structure of reinforced concrete, brick, steel

View of the placement of reinforced concrete slabs. Slabs are poured one on top of another on the first floor slab. Cured slabs are lifted hydraulically. The slabs could be poured in place but at the expense of more time and money.





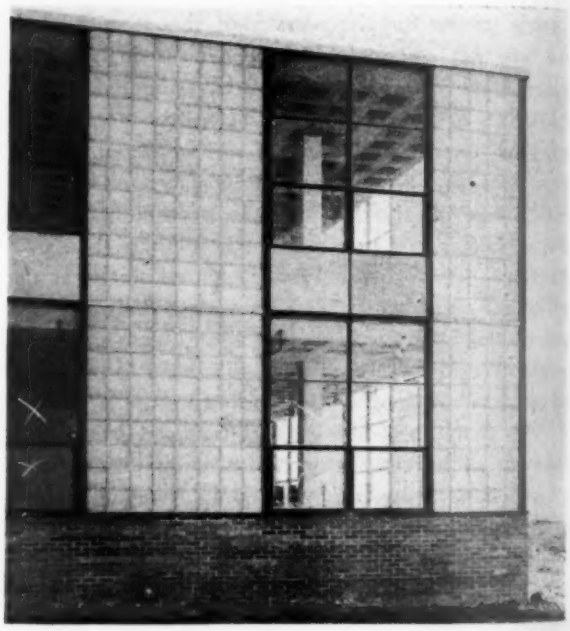
Interior view of future lecture room showing alternate panels of translucent glass block and glazed window sash. In most cases columns occur in partitions, but in larger rooms they are exposed and plastered. There are no bearing partitions.

and glass, and is complete in all respects, even to walks and drives, cafeteria kitchen equipment, lockers, bleachers and gymnasium paraphernalia.

Fortunately for all concerned we had decided in the beginning on a building designed for easy change both before and after construction. There are no bearing partitions and there is no bearing on external walls, since the floor and roof slabs are cantilevered over columns set eight feet in from the walls.

Basic Construction Features

We also decided that we must use a basic construction which would be fireproof, low in cost and quickly erected. We designed light-weight concrete coffer blocks strong enough to support the weight of the concrete and steel filling over a two-foot span. We designed the slabs without beams or drop panels. The resulting slabs look like a waffle from below with solid concrete sections around the columns to resist the shearing stresses, and a light-weight concrete surface over the entire remainder. This surface, when spray painted, looks well and absorbs sound very efficiently. The slabs can be lifted or poured in place at the contractor's option.



Exterior portion of the academic wing. Translucent and transparent curtain wall, capped by extruded aluminum coping, encloses the cantilevered reinforced concrete slabs. Slabs are surfaced on the under side with sound absorbing light-weight concrete finished by spray painting.



Interior view of the corridor. Lockers with sloping tops will be installed in the recesses and translucent glass will be installed in the upper openings.



This classroom is being temporarily used for dispensing athletic equipment. Workmen are rushing completion of the building. Spherical lighting fixtures produce even lighting and avoid contrasts.



Social hall of the high school. Room at the rear is the library.

We chose spans of 24 feet by 22 feet for our columns and turned our classrooms endwise so that the columns normally fall in the dividing partitions. This departure from custom is amply justified by a field investigation of the uses of daylighting in classrooms. A great deal of effort and expense has been put forth by our office and many others to provide the best daylighting for classrooms. Yet we find that teachers obviously prefer the unvarying quality of artificial light and use it regardless of the natural lighting system provided. Why, then, spend money on extra corridor space and extra perimeter? We decided not to, and the Board and county superintendent backed us up. Classrooms are 24 feet by 32 feet, short side out. The 24 feet of outside wall, however, is glass block and sash in eight-foot vertical strips extending from floor to ceiling. There is no opaque outer wall.

The resulting construction reduces vertical supports to a minimum and affords the most complete flexibility in space arrangement. Interior partitions are of light-weight concrete block exposed on one side and plastered on the other. This combination allows the mason to produce one perfectly smooth block face in a wall made of one four-inch thickness, while the plasterer covers the resulting irregularities on the other side. More important, the plaster adds very greatly to the sound transmission resistance of the wall. The exposed light-weight block face is spray painted, making another excellent acoustical absorbing surface in addition to the ceiling.

Various types of movable partitions were investigated and discarded because of their high initial cost. The flexibility possible in planning has already paid great dividends. After letting of construction contracts, changes in the partitioning of some areas were required because of the detailed study of equipment arrangements then being made by the principal. These were easily accomplished since no structural change was necessary.

We also determined to expose the horizontal runs

of almost all utility services. This made them faster and cheaper to install, and greatly facilitates maintenance or alterations. For the lighting we chose incandescent glass spheres 16 inches in diameter suspended on stems and spaced uniformly 8 feet on center in both directions throughout the building. Since all horizontal conduit runs are exposed it is a simple matter to rearrange switching to suit future partition changes.

Central Fan Exhaust System

The building is ventilated by a central fan exhaust system and the main ducts run at the ceiling parallel to the corridor. Ordinarily these ducts would be run over the corridor lockers, and encased in metal lath and plaster. This we rejected because we wanted light corridors, and to get this we planned to use continuous translucent glass from locker top to ceiling. The duct runs were moved toward the outside walls and constructed of asbestos-cement which is neatly finished and painted to match the ceiling.

The result of these innovations is a building which impresses the visitor as clean, light and business like. The exposed utilities are not crude, but seem to fit into the general scheme with surprising success. Perhaps we have arrived at a time when the public no longer regards a neatly painted exposed conduit pipe with the same chagrin that a lady once felt over an exposed ankle.

Three Main Building Areas

In general plan the building is divided into three main parts: a shop wing, a gymnasium-auditorium and an academic wing. Physical separation of these units was avoided for reasons of convenience in circulation and for economy. Main stairs in the academic wing are used for exit traffic from the gymnasium balconies, and the gym acts as a buffer between the quiet required for the academic wing and the noisy shop wing. Locker and shower rooms for the two sexes are located on opposite second floor balconies where complete segregation and privacy are achieved. "Cheap" and unsatisfactory basement space and so-called English basement arrangements were avoided entirely except for the boiler room, since we wanted all the students to have light, dry, airy accommodations.

The boiler is arranged for fuel oil, with planning provisions for later conversion to coal-fired stokers if price conditions warrant. Exhaust gases are carried off by an induced draft device called a bifucator, the stack for which projects only a few feet above the roof instead of the usual 60-foot high hollow pillar of masonry which mars the appearance of so many school buildings. Incidentally the bifucator costs less in our area, and does not impede airplane operations on the nearby landing field.

In the gymnasium-auditorium all bleachers are of the folding type and certain units are also portable so that they can be moved to a position facing the stage, thus partially overcoming one of the principal objections to the combination gymnasium-auditorium, namely, the poor sight lines to the stage.

The division of the gym for joint activities by both sexes offered a considerable problem because the axis of division was the same as the ridge line of the trusses, and the height from floor to roof is 55 feet. A movable partition was discarded because of its high cost and unmanagable proportions. We used instead a net, with the lowest six feet covered with canvas. Mr. Murray had operated physical education classes so divided, and had found it entirely satisfactory.

Examining Expensive Assumptions

Throughout our planning activities we found the field studded with clichés and foregone conclusions which apparently have been accepted without question for years by school boards, architects and educators. The challenge of a limited budget, little time and an enormous need provided the impetus to re-examine some of these expensive assumptions. In every case we checked very carefully the reasons for the accepted design standard before deciding to make a change.

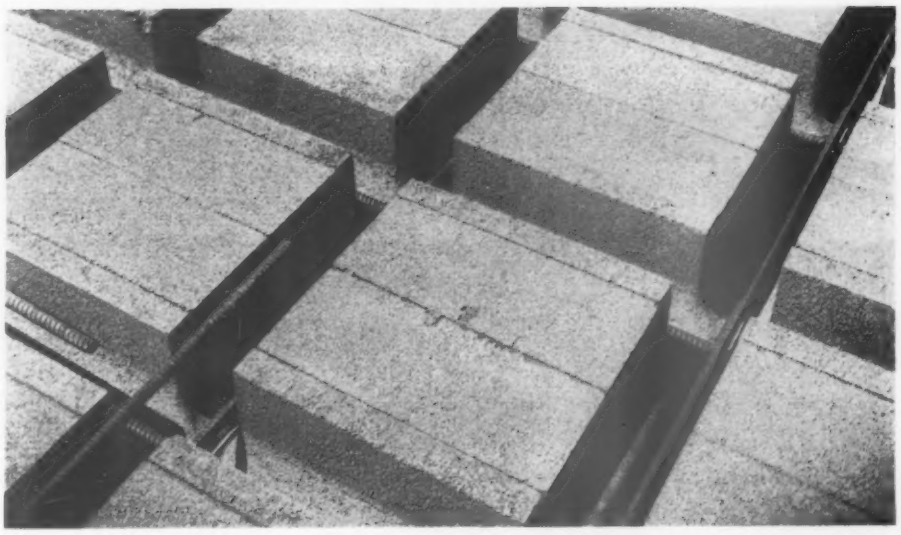
During this process we conceived the idea of placing laboratories in the center of the plan and circulating around the outside. This would concentrate the utilities, but spaces had to be left open on the outer or corridor side except for head high cabinets. We wondered if we could accomplish acoustical isolation by baffles of some type or by absorption.

Just at that time we received a copy of an architectural periodical which showed a new school treated in just this way. The architects were distinguished in the field and we were encouraged to go farther with our plan. We checked the matter with our acoustical consultant, Mr. M. A. Smith. He said flatly that it could not be done. Too much cross-talk, he said.

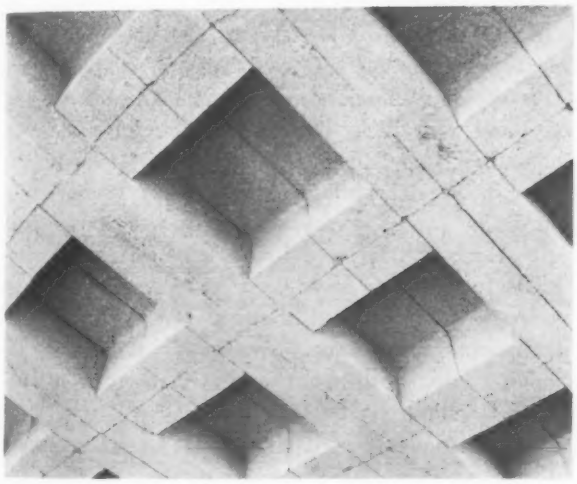
In our confusion we decided to telephone the principal of the school constructed with the open classroom-corridor arrangement. She told us that the room pictured was the only one in the school done in that manner and that while the board was highly pleased with the school as a whole, this room was quite unsatisfactory because of noise and a separating wall was to be constructed that summer! We went back to the standard central corridor plan.

Concrete Coffer Blocks Developed

While completing our plans we worked intensively on the development of the light-weight concrete coffer block form for the structural slabs. The unit size of 24 inches by 24 inches was decided upon and a 2-inch thickness of the shell was selected. The problem was how to make the shells. The only concrete shells made like this previously had been cast individ-



Precast light-weight coffer units. Structural concrete is poured over these to a depth of three inches over the upper surface, forming a strong slab with two directional ribs. There are no beams or drop panels to interfere with utility installations. Coffer units can be made in any locality on a concrete block machine using special moulds. Production rate is one each eleven seconds.



Detail of a typical light weight concrete acoustical ceiling formed by the underside of precast form units.

ually by hand. We rejected this idea as too slow and too costly and went to Irions Concrete Block Company for advice on how these units could be made on a concrete block machine. The answer was simple: it was impossible if the coffer had to be in one piece. We said it could be divided; but no one could figure how to divide it so that the parts could be made.

Mr. Irions was interested, however, and suggested asking the Besser Manufacturing Company, maker of the block machines. We did, and they came up with a division of two center saddles and two end sections which looked good. When the moulds were finally completed and the end sections cast in the machine, the edges broke. We revised the profile of the mould several times until, finally, two weeks after our plans were out for bid we learned that our joint efforts had been successful. The coffer blocks can now be produced at the rate of one every eleven seconds using a standard Besser machine.

In the meantime we had a request from Pre-Stress Inc. asking permission to quote using a removable plastic coffer, developed by the Ohio Lift-Slab Corporation, and pre-stressed reinforcing. Although we felt it necessary to reserve judgment on acceptance of this technique, a bid was submitted. The price was slightly lower than that for conventional reinforcing and light-weight concrete coffers. The under surface of the construction, however, was stone-hard concrete with no acoustical absorbing ability. When we added any material to overcome this lack, the price was considerably greater, so we did not look farther.

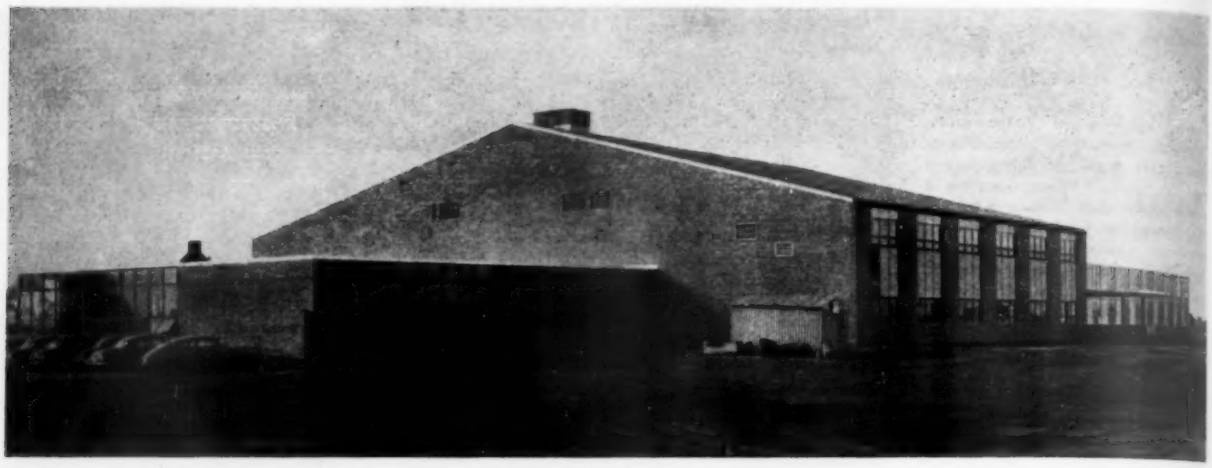
High School Rises in One Year

The school opening, scheduled for October 19, 1953, was two days less than a year after the date of the signing of the building contract. In spite of a general building labor strike of over two weeks' duration, the contractors, C. Iber & Sons of Peoria, have turned in a splendid performance in terms of time and quality of construction. Bright clean interior colors in considerable variety are being applied in accordance with a carefully worked out color scheme. Ceilings are uniformly bone white in color.

Interior painting, asphalt tile floors, lockers, gymnasium bleachers, basketball backboards and walks, drives and parking areas are all included in the costs given. Grading plans for the entire site were prepared under our direction by Scruggs and Hammond, landscape architects.

Costs for the entire project have been encouragingly low, and maintenance costs should be at a minimum. No item of the building was selected on cost alone. Some items, like the heavy duty steel sash, were consciously selected because they are believed to be the best available, though surely not lowest in first cost.

School patrons keenly anticipate the use of the big gym, seating 2,400, the lecture room for clubs,



Construction progress photograph of the Limestone Community High School, Limestone Township, Peoria County, Illinois. This fireproof building was completed in one year by lift-slab at a cost of $11.48 per square foot, plus movable equipment.

committees and smaller groups and the library, which is provided with a special entrance for night use. Arrangements have been incorporated for the showing of movies in the gym, although a formal projection booth has been avoided because of the elaborate restrictions and precautions placed upon such rooms by law.

Open steel rolling grilles are provided in the corridors to permit closing off sections of the school for separate use. These require only a simple channel at the sides, leaving the full width of the corridor open for normal traffic when the grilles are rolled up.

It should be only fair to emphasize the need for adequate time for planning. This gives the architect and administrator an opportunity to make the building as near perfect in design and arrangement as possible. The completion and occupancy of the building in the time allotted was felt by all to be impossible, yet it has been accomplished by close cooperation among the Board of Education, the administrator, architect and building contractor.

Philosophy Behind the Design

Finally, a word or two about the philosophy behind the design may be in order. Our physical problem, as we understood it, was to produce a durable structure suitable for expansion, with interior arrangements easy to change, well lighted, ventilated and with the best temperature control. The achievement of these objectives with economy and speed was imperative.

Educational philosophy had little bearing upon our design except to indicate that an educational structure which will be used for at least fifty years needs flexibility if it is to serve well. Ideological neutrality is nowhere more justified than in the design of such permanent institutional structures. Otherwise the building must be thrown away with the current fashion in teaching.

The citizens of the United States face a hard enough problem in providing adquate education for their children without the added burden of school structures designed for early obsolescence; it is our belief that the improvement of school structures is the proper field for architects, and that we can leave to others such questions as how free should the student be and the psychological effect of various types of partition enclosures. The main thing, we believe, is to make sure the partitions can be moved. Then the building becomes a true teaching tool rather than a teaching cage.

MODERN FACILITIES AT ELLIS COUNTRY SCHOOL FOR GIRLS



by PHILIP A. BOYER

Schools Consultant, The Ballinger Company, Philadelphia, Pa.

Dr. Boyer received his Bachelor's degree from Temple University and his Master's and Doctor's degrees from the University of Pennsylvania. For more than 40 years he was connected with the Philadelphia Public School System as teacher, principal, organizer and director of the Division of Educational Research and associate superintendent of schools in charge of school buildings. Dr. Boyer's major emphasis has always been on school accommodations. In 1952 he joined The Ballinger Company as schools' consultant.

ELLIS Country School for Girls, Newtown Square, Pennsylvania, is operated by the Provident Trust Company of Philadelphia, serving as trustee of the estate of the late Charles E. Ellis. It is directed through a trustee committee with Mr. Carl W. Fenninger as supervising director. The president of the school is Dr. Arnold E. Look. In addition, there is an administrative provision for an educational advisory committee of leading educators.

The Upper School offers regular academic and college preparatory subjects, plus major courses in grades 10 to 12 in art, home economics and commercial subjects. The Ellis Lower School course of study stresses the fundamental subjects: English, reading, spelling, writing, arithmetic, history, geography, elementary science and nature study, music, art, home economics, dramatics, handicrafts and physical education with dancing.

Aims of the School

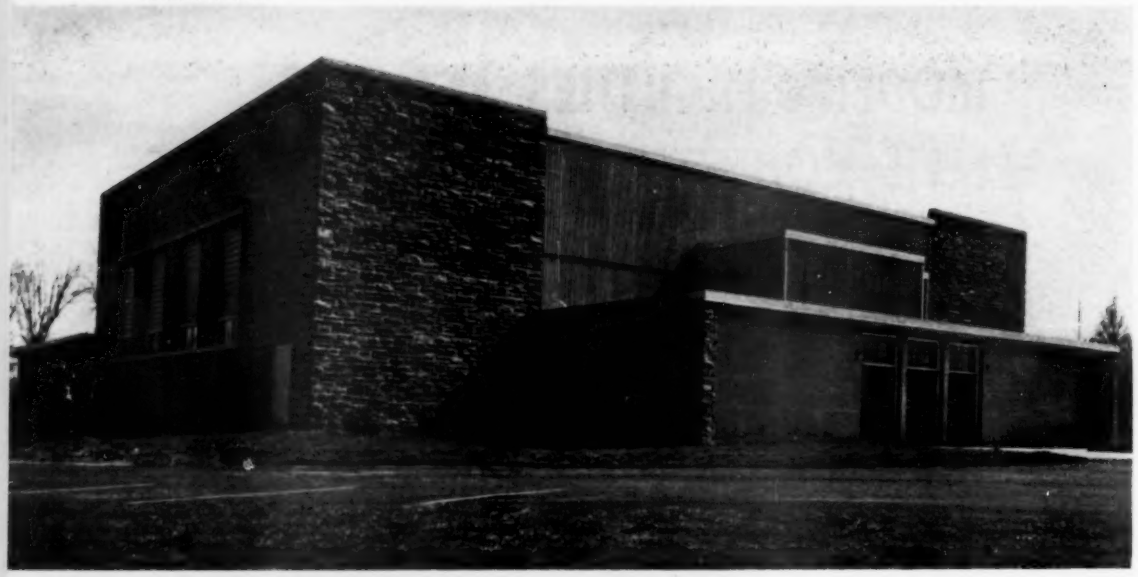
Emphasis is given to character and citizenship values. The school is non-sectarian with high regard for spiritual development and voluntary church attendance. Special provision is made for good nutrition and



Clark

Ellis Country School for Girls, Newton Square, Delaware County, Pennsylvania, occupies 310 acres of trees, shrubbery and rolling green fields. Main buildings are shown above.

Condax Studios



Auditorium - Gymnasium building, The Ballinger Company, architects and engineers, provides extensive floor and stage space for auditorium use, seating 1,000. Floor of the gymnasium is shown at left.

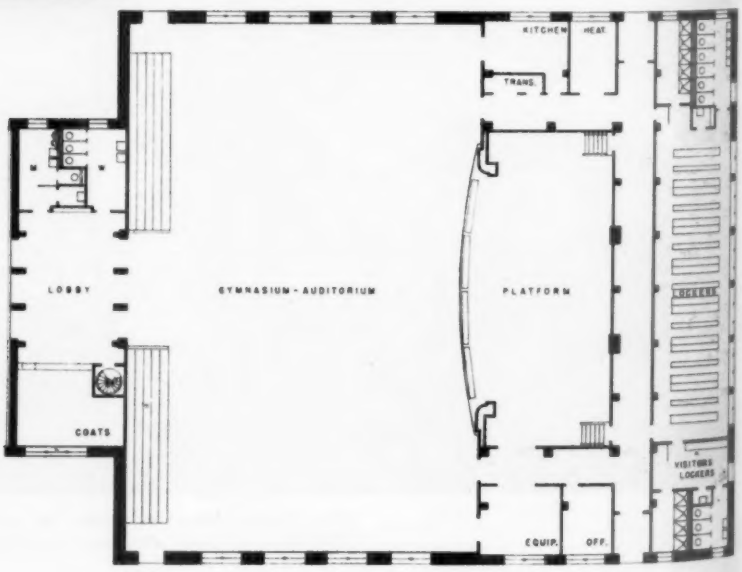


health care, individual attention and guidance, remedial reading and arithmetic—where tests and observation indicate need for them, the recognition and encouragement of individual interests and abilities, and a happy atmosphere in all the relationships of students and staff.

Growth of the School Plant

From a beginning of four dormitory cottages and two reconstructed farm houses, the school plant at Ellis Country School for Girls grew by 1932 to comprise five staff houses, extended dormitory cottages and Ellis Hall, a substantial stone administration and classroom building.

In addition to this, a swimming pool, sixteen camp cabins, a central lodge and an infirmary provided a complete summer residence camp. Two hockey fields,



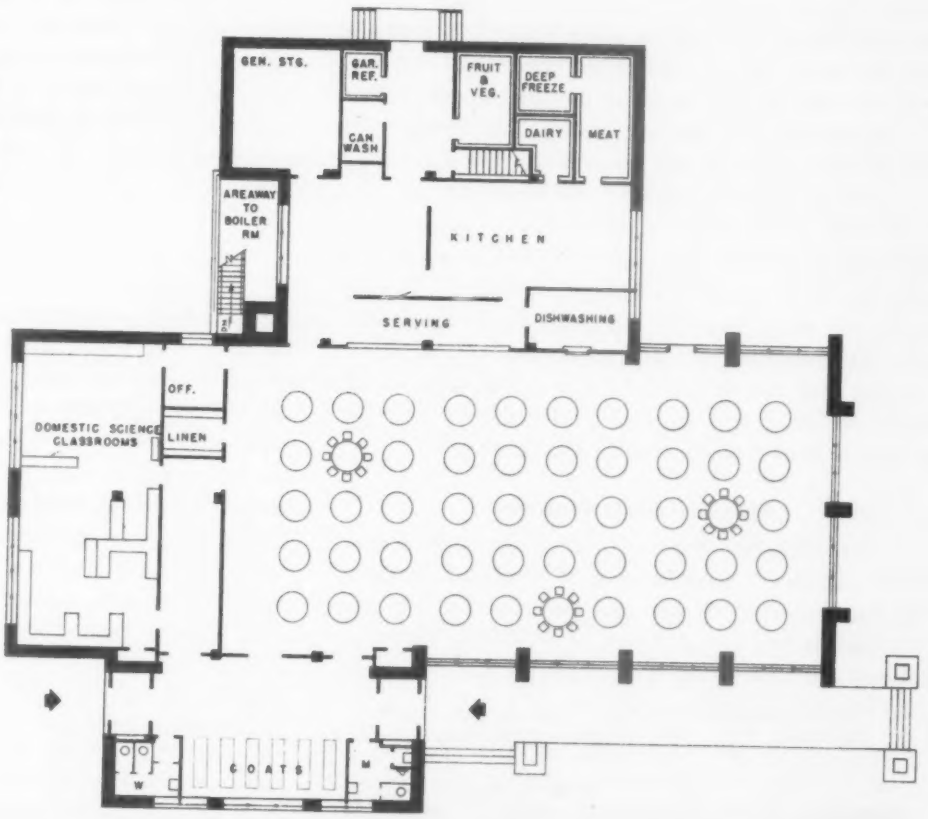
The Ellis Auditorium-Gymnasium has facilities for all types of indoor sports. Other areas include a locker room, kitchen, office, lobby and equipment room.

tennis courts, a large outside paved games and sports area and extensive playing fields were developed. A separate campus and dormitory for the Junior School were added in 1949. The arboretum on the Ellis campus contains nearly 600 varieties of trees and shrubs, many labeled with botanical and common English names.

Recent Renovations and Additions

In 1950 Ellis Hall was almost totally destroyed by fire which left standing only the fortress-like outer stone walls with classical Ionic façade. To retain these aesthetic values and to extend the classroom and administration facilities of Ellis Hall was the problem presented to The Ballinger Company, Architects and Engineers, Philadelphia, Pennsylvania. Within the brief period of seven months, the wings of Ellis Hall, with modern, educationally stimulating classroom facilities were restored for the opening of the school year in September.

Ellis Commons provides a dining room with a capacity of 320, a large kitchen, homemaking instruction facilities and also houses the heating plant for other campus buildings. The dining room is shown below.





Some months later, the central section of the building with its original, imposing Grecian façade was returned to use having been made fire-resistant and completely redesigned within to provide a school library, art studio, science laboratory, ten sound-proofed music practice rooms, twelve modern offices, showers and lockers, a student store, a student recreation center and a dark room for photography.

The renovation after the fire and the expansion of Ellis Hall presented interesting architectural problems. The dressed Foxcroft stone of the walls had to be repaired and replaced at some points. To modernize the fenestration to meet standard light requirements of the modern classroom required the expansion of existing window openings without interfering with the beauty of the dressed stone walls.

A new concrete building was erected inside the stone wall shell of the original structure. Concrete slab floors were carried on newly installed footings and columns so spaced as to avoid overloading the original walls that were preserved. As a result of this design, Ellis Hall presents the inside appearance of completely modern and functional architecture and engineering, while retaining outwardly the calm dignity and the imposing beauty of its original classic design.

Two Buildings Planned

The Ellis Hall fire was not an unmixed disaster. After planning the restoration of damaged facilities, the trustees went further and provided for two new outstanding features at a cost of $650,000. These additions were the Ellis Auditorium-Gymnasium buildings and the Ellis Commons.

The new Ellis Auditorium-Gymnasium building has outer walls of local stone to complement the dressed Foxcroft stone of neighboring Ellis Hall. The 65 feet by 103 feet auditorium-gymnasium is spanned by steel trusses, supporting a poured gypsum deck placed on insulating form board, which provides an economical acoustical treatment as well as the required insulating factor.

The building provides facilities for a regulation-size basketball court and two junior courts, four volley ball and four badminton courts, individual lockers and showers, physical education offices, an unusually large stage for dramatics and pageants, an auditorium with an approximate seating capacity of 1,000, a large floor for school dances and other social occasions, a spacious lobby, an organ loft with a Hammond organ, a motion picture projection room, a well-equipped kitchen and modern amplification.

Ellis Commons

The new Ellis Commons also has outer walls of local stone. It accommodates 320 students and faculty in the dining room with its spacious outdoor atmosphere created by vast picture windows overlooking the expansive campus grounds. A roof overhang prevents glare and lends distinction and attractiveness to the building. The Commons roof is a single span supported by rolled steel girders. The ceiling of the dining room is suspended acoustical plaster.

Besides the dining room, the building provides a complete kitchen, refrigeration and food facilities. Here also are located the central heating plant for the campus and extensive home economics laboratories to facilitate the attainment of one of the school's major aims—homemaking.



Exterior view of Ellis Commons, The Ballinger Company of Philadelphia, architects and engineers.

COLLEGE AND UNIVERSITY SPACE REQUIREMENTS



by DONOVAN E. SMITH

Principal Planning Analyst, Office of Architects and Engineers, University of California

Donovan E. Smith is a graduate of the University of California's College of Engineering. Prior to World War II he was assistant industrial engineer of a large textile manufacturing firm in the East. In the Army he served as director of two technical specialist schools and later as the commanding general's staff construction officer for all anti-aircraft and harbor defense installations in the Panama Canal Zone. After the war Mr. Smith joined the administrative staff of the University of California as an industrial engineer. He is currently a member of the American Standards Association Committee Z65 on the measurement of building areas.

THE University of California has planned the construction of some $150,000,000 worth of buildings since World War II, in part to meet the veteran load of the post-war period, but chiefly to meet the rather overwhelming permanent needs of one of the fastest growing populations in the United States. The measurement of building space requirements has developed into a responsibility consuming the time of four full-time planning analysts and a member of the architectural staff as a part-time planning analyst, plus editorial, statistical, stenographic and drafting services. This planning analysis division is a part of the Office of Architects and Engineers under the vice-president in charge of business affairs.

The present report is preliminary in character, and does not necessarily represent an accepted policy of the University of California. It is not known, as yet, how well the recommendations will work out in practice. They are guides for the future rather than conclusions drawn entirely from past tested experience. It is published as much to generate criticism and stimulate comment as to offer advice. The University of California would be pleased to know of similar studies being made elsewhere.

While taking responsibility for information presented in the following paragraphs, the author would like to acknowledge indebtedness to all past and present staff members, particularly J. W. Neil, C. R. Routsong and J. W. Tippetts.

Floor Areas for Teaching Departments

In addition to just about everything from a 1,500-student liberal arts college to a 20,000-student university campus, including colleges and schools of agriculture, engineering, law and medicine, as well as several other professional schools, the University of California has two campuses which, at present, are devoted exclusively to research and have only a few advanced graduate students in attendance: Lick Observatory at Mt. Hamilton and Scripps Institution of Oceanography at La Jolla.

Several large segments of this complex, widely dispersed institution seem to defy analysis in terms of per-capita floor areas. Nevertheless, there appears to be a very good possibility of our becoming able to define accurately, in terms of square feet of building space per person, the normal requirements of nearly all teaching departments, not only on the University of California's several campuses, but in any other reasonably typical college or university.

Our present best estimates of the per-capita building space needed for the various activities of teaching departments are presented in the accompanying Table I. Libraries and other collections on the

scale of the main campus library and formal museums require amounts of building space which are indirectly, if at all, related to mere numbers of students and faculty members. The unit areas arrived at, therefore, provide for only the relatively small collections which typically develop within a department more or less in proportion to the number of faculty members and to the number of students involved at each level of instruction.

We have also found it impractical to include any specific provision for sponsored research because the magnitude of such programs—particularly those involving Federal contracts—bears no discernibly consistent relationship to the number of students. To the extent, however, that the development of such programs is reflected in the number of faculty members in each department concerned, application of the unit floor areas shown will result in some provision for sponsored research. Otherwise, our proposed standards do not provide for a more extensive research program than that which is normally a concomitant of the teaching programs concerned. Similarly, we find it impossible to define, in terms of the teaching program, such other building needs as those of college and campus administration, student health service, faculty clubs, student unions, auditoriums and theatres, residence halls and intramural and intercollegiate athletics.

We do not mean these omissions to imply that there should be no provision for sponsored research or other special activities. We are simply forced to leave such provisions for separate determination and justification beyond, and sometimes far beyond, what can be related directly to the teaching program. Fortunately, there has been considerable study and there is fairly extensive literature in the field of the planning of libraries, auditoriums, theatres, hospitals, clinics, student unions and residence halls. Given a policy on the capacity to be provided in such buildings, college administrators and architects already have a good start on the planning.

Definitions of Terms

The following definitions of terms are necessary to an understanding of the measurements used in our proposed standards.

Net Floor Area. We define the net floor area of a building as the sum of the individual floor areas, measured between surfaces of walls and partitions at or near floor level, of all rooms and other finished, enclosed, covered spaces with clear standing head room (6 feet 6 inches minimum), *excluding* the following areas:

Construction and Mechanical: All walls and partitions; fuel and building service equipment rooms; shafts, stacks, tunnels, closets and chambers for heating, ventilating, air conditioning, piping, communication, hoisting, conveying, electrical and other services of the building.

Custodial: Rooms, closets, storage areas, toilets, locker rooms and other areas assigned to building service and custodial personnel employed to protect, supply, operate, maintain and manage the building structure and its services.

Circulation: Corridors, lobbies, stairways, elevators, escalators and other areas which provide circulation of general traffic.

Public: Toilets, rest rooms and other conveniences which are directly accessible to all occupants and visitors in the building.

We believe that there are at least three excellent reasons for measuring building space as outlined above. First, the totality of a building's interior floor area here referred to as "net" seems most closely to represent the floor area which directly accommodates the primary functions of the building. Second—and much more important, particularly in planning new buildings and in evaluating the "efficiency" both of proposed plans and of existing buildings—the net floor area, as defined above, is the measurement which seems most nearly independent of type of construction, style of architecture and kind of climate. Third, beyond the rooms which we define as constituting net floor space, the required areas of a proposed building cannot be accurately specified until technically qualified consideration has been given to the architectural design.

We recognize the value of certain gross measurements in comparing and estimating construction costs; but if, for example, it has been decided that a certain number of classrooms, laboratories and offices should be of a specific size, the measurement in terms of *net* square feet will be the same, whether the space is to be provided in a rambling one-story building with unheated rooms opening directly into a tropical outdoors, or in a multi-story steel-and-stone structure with vast areas devoted to corridors, elevators and heating or air conditioning equipment. Only in such terms, we believe, can one logically write the basic verbal or tabular description of a projected building, or compare the building space provided for one department or institution with that provided for another.

Types of Room. The categories in which we tabulate the area of rooms defined as constituting the net floor space of a building are as follows:

Instructional—auditorium or theatre, classroom, teaching laboratory, teaching laboratory service, seminar or conference, library, study hall, museum art gallery, gymnasium service.

Office and research—faculty office and seminar, office and research laboratory, re-

search laboratory, administrative office, administrative and faculty office, animal quarter, research laboratory service.

Miscellaneous—general service, storage, shop, food service, infirmary or hospital, student center, staff center, field building.

Only a few of the terms seem to require explanation for the purposes of this article.

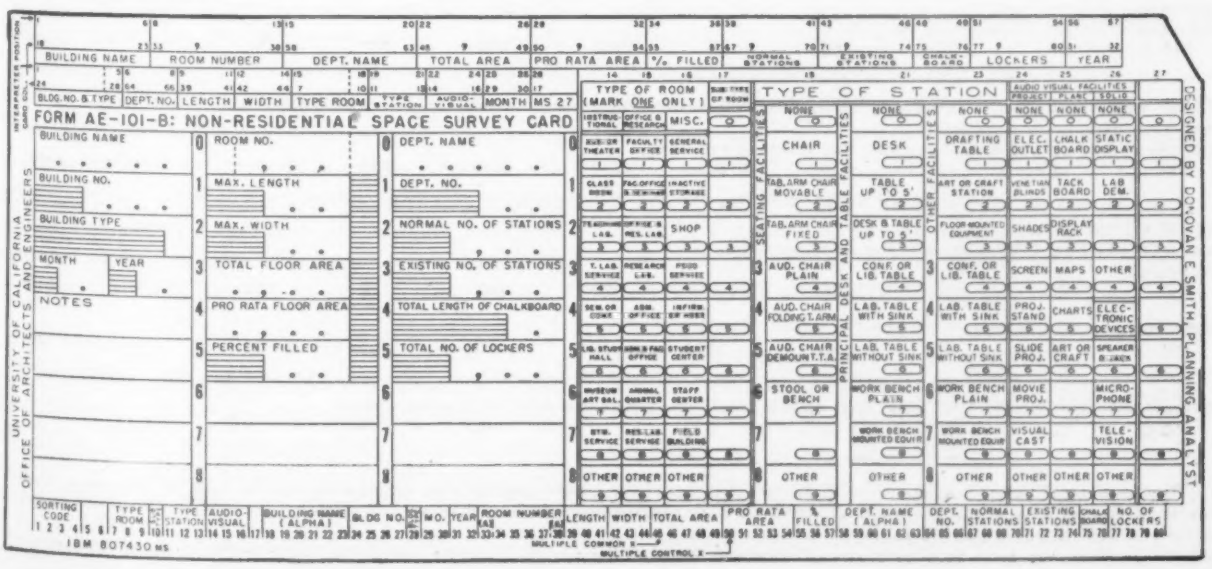
We define "classroom" as any *general-purpose* instructional room designed primarily for lecture, lecture-demonstration or recitation classes, i.e., a room typically equipped with tablet-arm chairs or auditorium-type chairs. We define "teaching laboratory" as any *special-purpose* room for organized classes, including art, drafting, music, physical education, statistics, etc., as well as the rooms more commonly referred to as laboratories or instructional shops. Because we classify the "activities" areas of a gymnasium as teaching laboratories, the gymnasium service rooms (showers, dressing rooms, locker rooms, etc.) are functionally equivalent to the category, "teaching laboratory service." We reserve the category "shop" for rooms in which fabrication, maintenance or repair operations are performed for purposes not directly those of instruction or research in the operations themselves, for at the college level we find ourselves unable to define any distinction corresponding to that which is commonly made between "laboratory" and "instructional shop" in surveys of primary and secondary school space.

We define "field buildings" as consisting of barns and other farm buildings; greenhouses, headhouses, lathhouses, sheds for tools, implements, etc.; and other relatively small frame buildings typically without finished walls and floors—in other words, buildings which are common in the outlying land areas of an agricultural college, but which rarely exist anywhere else in a university. The unit areas proposed for agriculture in this article include no specific provision for buildings of this type, for such needs are far more a function of the extent of the college's fields and field activities than of the numbers of students and faculty members.

A special IBM card is used in tabulating data on the above types of rooms. Very precise definitions of all types of room, as well as detailed instructions for some fairly complicated IBM processes, involving two other card forms and five different tabulating forms, are required for the annual collecting and summarizing of the data we use in our studies.

Full-Time-Equivalent (FTE) Student. The term "full-time-equivalent student" was clearly and concisely defined by W. C. Huntington in the minutes of a meeting of the University of Illinois' Building Program Committee in 1950, as follows: "The number of full-time-equivalent students is the number of students who, if registered for a full schedule in a department, would cause the same teaching load as is caused by the greater number of students who register for only a part of their schedules in that department." In the system of credit values used at the University of California and at many other institutions, a total of 120 semester credit-hours (units of credit) is the most common minimum requirement for graduation. We therefore follow the common practice of assuming that 15 undergraduate student credit-hours (units of credit earned in one semester by individual students) represent one full-time-equivalent undergraduate student. We then divide the undergraduate instruction into lower division (freshman and

This type of card is filled out and punched for each room. The complete set is kept up-to-date and reproduced mechanically into work cards each fall. Work cards are listed and tabulated to summarize the recorded information, and then combined with cards recording class schedules to produce space utilization data tabulations.



sophomore courses) and upper division (junior and senior courses).

The measurement of teaching loads at the graduate level is a more difficult problem. Principally because the total number of FTE undergraduate students computed for a campus approximates the total number of actual undergraduate students, we base our computation of FTE graduate students on an empirical relationship which makes this FTE number, also, a fair approximation of the actual number. Excluding certain professional schools, we find that dividing by 4 each department's total number of student credit-hours in all its graduate courses gives a number which approximates the actual number of graduate students studying in the corresponding subject fields. In the professional schools, excluded from the aforesaid computation, the relationship averages about 12 student credit-hours in graduate courses per actual graduate student. Our use of this average relationship in the computation of FTE graduate students in each of those schools is, however, more expedient than accurate, for the closeness with which the resulting figure approximates the actual number of graduate students varies considerably from one school to the next.

Obviously, there is duplication in the FTE totals computed by the above methods, for graduate students are counted twice to whatever extent they are enrolled in undergraduate courses. Complete measurement of the teaching loads and space requirements of undergraduate courses requires, however, that all

TABLE I

Proposed Unit Floor Areas for Teaching Departments in Colleges and Universities

These proposed standards are intended to provide for relatively small, informal, departmental libraries and other collections, but not for the main campus library and its major branches, nor for large-scale museums, art galleries and the like. Also requiring separate determination are the floor areas of such facilities as auditoriums and theatres (beyond those which can be fully utilized as classrooms), college and campus administrative offices, student health service, faculty clubs, student unions, residence halls and intramural and intercollegiate athletic facilities.

ARTS	LANGUAGES AND LITERATURE	SOCIAL SCIENCES	BIOLOGICAL SCIENCES	MATHEMATICS	PHYSICAL SCIENCES	AGRICULTURE	ENGINEERING	OTHER PROFESSIONS	MILITARY SCIENCES	PHYSICAL EDUC.
1	2	3	4	5	6	7	8	9	10	11
UNDERGRADUATE NON-LABORATORY INSTRUCTIONAL SPACE: (Classrooms and seminar rooms)										
Net square feet per FTE undergraduate student:										
12	12	12	12	12	12	12	12	12	12	12
UNDERGRADUATE LABORATORY INSTRUCTIONAL SPACE:										
(Teaching laboratories, including related laboratory service rooms)										
Net square feet per FTE lower division student:										
80	5	.5	60	5	60	80	100	10	80	(a)
Net square feet per FTE upper division student:										
100	10	10	80	10	80	120	150	20	100	80
GRADUATE INSTRUCTIONAL AND RESEARCH SPACE: (Research laboratories, seminar rooms, departmental libraries and other departmental collections)										
Net square feet per FTE graduate student:										
140	30	30	160	40	160	200	200	60	(b)	160
STAFF RESEARCH SPACE: (Research laboratories and related laboratory service rooms, conference rooms, departmental libraries and other departmental collections)										
Net square feet per FTE faculty member and teaching assistant:										
100	40	40	250	60	250	300	300	80	40	100
STAFF OFFICE SPACE:										
Net square feet per FTE faculty member and teaching assistant:										
Academic:										
160	140	140	130	140	130	150	180	180	140	140
Administrative and service:										
30	30	30	50	30	50	60	60	100	100	100
DEPARTMENTAL SHOPS, STORAGE AND MISCELLANEOUS: (Percent of total of all areas above)										
10%	5%	5%	10%	5%	10%	10%	15%	10%	15%	10%

(a) The amount of building space required for physical education varies greatly with the climate and the type of curriculum. Under the conditions existing at the University of California's several undergraduate campuses, the normal requirement appears to be of the order of 1,000 net sq. ft. per FTE physical education student.

(b) No standard has been developed, even tentatively, because there is no graduate instruction in the military sciences departments at the University of California.

student credit-hours earned in those courses be counted at the level of the instruction concerned. The full-time equivalence of the graduate instruction received by a typical group of graduate students is overstated by an FTE number equal to the actual number, not only to the extent that the average graduate student is enrolled in undergraduate courses, but also to the extent that some graduate students carry less than a full program of study because they are working as teaching assistants or in other capacities. We have, however, attempted to allow for these factors in specifying the space requirements in relation to the FTE numbers.

Full-Time-Equivalent (FTE) Faculty Member and Teaching Assistant. For the purposes of our studies, we define "faculty member" as comprising (in terms of University of California titles) professor, associate professor, assistant professor, instructor, lecturer and associate, including equivalent clinical ranks and equivalent ranks of physical education supervisors. We assume that the full-time equivalence of a faculty member's appointment is adequately measured by the fraction of his total salary which is charged to the budget of the teaching department concerned—assuming, also, that his total salary is reported as an appropriate fraction if his overall appointment is less than full-time. The position we refer to as "teaching assistant" is typified by that of a graduate student employed for teaching duties which constitute a half-time job.

Unit Areas for Undergraduate Laboratories. Although not exactly a definition of a term, some explanation of the unit areas listed for undergraduate laboratory instructional space should be included at this point. Obviously, the space requirement is directly related to the amount of laboratory instruction and would be more accurately defined in terms of square feet per FTE *laboratory* student, i.e., the number of square feet of laboratory space required for 15 student credit-hours consisting wholly of laboratory instruction. To simplify both the computation of FTE numbers and the application of the unit areas, we have based most of the unit areas for undergraduate laboratory space in Table I on teaching programs of which approximately one-fourth, as measured by student credit-hours, is laboratory instruction. If an appreciably greater or lesser relative amount of laboratory instruction is involved, the unit areas for undergraduate laboratory space should be correspondingly adjusted.

Applying Standards to a Building

The method of using the unit areas listed in Table I can perhaps best be explained in terms of an example. Table II shows an application of our proposed standards to a purely hypothetical "Mathematics and Physical Sciences Building." The assumed teaching loads are of the order of magnitude of those on a university campus with a total registration of about 5,000 students and a fairly complete program of instruction at all levels in all general subject fields. We have not, however, attempted to make the relative teaching loads in the four departments more than very roughly typical. For each assumed teaching load the corresponding academic staff has been estimated on an arbitrary basis of one FTE faculty member or teaching assistant for every 30 FTE lower division students, one for every 20 FTE upper division students, and one for every 10 FTE graduate students. We use a "sliding scale" below 100 FTE students in a division of a department to allow for the fact that, in such teaching programs, the required number of faculty members becomes more a function of the multiplicity of course offerings than of the number of FTE students. The floor areas listed in Table II are the direct result of the simple process of multiplying each FTE number by the corresponding unit areas listed in Table I.

Tabulating these areas as in Table II does not mean that the building would be designed with the different types of space neatly segregated according to the categories in which the figures are listed. No undergraduate classroom, for example, should be thought of as "belonging to" a department; in fact, it is only by having all such rooms under the control of and scheduled by a central agency that sufficiently high utilization can be achieved to permit 12 net square feet of classroom space per FTE undergraduate student to meet the classroom needs of an institution. The listing of classroom space for each department, as in Table II, should be regarded as being no more than estimates of *pro rata* shares of the total set of general-assignment classrooms.

Actual Areas and Estimates

The listings of undergraduate laboratory space come the closest to being figures representing building space clearly segregated according to function and department. The areas actually planned and built for graduate instruction and research, staff research and academic offices are, however, unlikely to resemble the tabulated estimate typified by Table II. The total floor area developed for such purposes should agree fairly well with the estimated total but, for example, much of the floor area estimated separately to be required for graduate and staff research will be planned and built as rooms to be used jointly by faculty members and graduate students. Similarly, the areas listed for academic offices will not necessarily be developed as separate rooms, distinct from those housing research facilities; the separate figures in Table II merely indicate the relative amounts of floor space to be equipped, on the one hand, with more or less conventional office furniture and, on the other hand, with appropriate facilities for experimentation, whether or not partitions divide the areas into physically distinct compartments. Furthermore, part of the area listed for

TABLE II

Typical Application of Proposed Standards to the Preliminary Planning of a Building

Showing the application of Table I to the development of a preliminary program for a hypothetical "Mathematics and Physical Sciences Building."

ITEM	MATHEMATICS	CHEMISTRY	GEOLOGY	PHYSICS	TOTAL
1	2	3	4	5	6
ASSUMED TEACHING LOAD:					
FTE students: Lower division	150	100	10	40	300
Upper division	50	100	30	120	300
Graduate division	50	30	5	65	150
Total	250	230	45	225	750
ASSUMED ACADEMIC STAFF: (FTE faculty members and teaching assistants)					
	18	15	7	18	58
ESTIMATED NET SQUARE FEET: (Based on above FTE numbers and Table I)					
Undergraduate classrooms and seminar rooms	2,400	2,400	480	1,920	7,200
Lower division laboratories	750	6,000	600	2,400	9,750
Upper division laboratories	500	8,000	2,400	9,600	20,500
Graduate instruction and research	2,000	4,800	800	10,400	18,000
Staff research	1,080	3,750	1,750	4,500	11,080
Academic offices	2,520	1,950	910	2,340	7,720
Administrative and service offices	540	750	350	900	2,540
Sub-total	9,790	27,650	7,290	32,060	76,790
Shops, storage, miscellaneous	490	2,760	730	3,210	7,190
Total	10,280	30,410	8,020	35,270	83,980
Total sq. ft. per FTE student	41	132	178	157	112

administrative and service offices represents the square feet which should be added to the faculty office planned for the department chairman to permit him properly to discharge his administrative duties.

Two Limitations to Table I

There are two limitations to Table I and to any application of its unit areas to a specific building, as in Table II. First, our proposed standard unit areas are intended only for such purposes as the development of preliminary and long-range building programs, including the estimation of the size of individual buildings in such programs with sufficient accuracy to permit the estimating of construction costs. Table I and applications like Table II can be, at best, no more than satisfactory short cuts for the occasions when answers must be found in circumstances which do not permit a thorough study of each individual case.

Second, because such tabulations are merely short cuts to answers which leave much to be desired in the way of detailed information, they cannot reasonably be used as anything more than a guide when the problem becomes that of developing working drawings, or even preliminary plans, of a building. Physical planning must be based on educational planning. Implicit in the design of every square foot of college building space are basic assumptions concerning the activities to be housed. Whether the faculty member, the college administrator or the architect makes those assumptions—and whether those assumptions are made logically or arbitrarily—every line and figure in the working drawings of a building presupposes a decision as to the personnel and activities to be housed, the subjects to be taught and investigated, the methods to be used, the policies to be followed.

Almost any conceivable error in our proposed unit areas could easily be overshadowed by the effects of a faulty decision as to the numbers of persons and the kinds of activities to be housed in a projected building. Even the simple question of how large each faculty office should be is less significant, cost-wise, than the question of how many faculty members should be ex-

pected to need space in the building. A group of faculty offices, each as much as 50 percent smaller or larger than the ideal size, does not represent as big a mistake as does a group of faculty offices of which there are about half as many as there should be.

Applying Proposed Standards to Entire Campus

In applying these standards to an entire campus, particularly when the purpose is to define a long-range building program, we find it can be done most conveniently if all the floor areas can be put on a per student basis. To do this, however, we must convert the figures for staff space on the basis of specific student-faculty ratios. The most practical approach may be to define the normal student-faculty ratio for each level of instruction in each type of subject field, based on optimum class sizes and a certain number of class credit-hours per instructional staff member. Although the latter figure might be the same for all teaching departments in an institution, the widely different types of instruction appropriate to different subject fields appear to dictate considerable variation in size of class—and, therefore, considerable variation in the optimum student-faculty ratios of different departments, even at a particular level of instruction.

We have, therefore, prepared Table III on the basis of three different sets of student-faculty ratios. For mathematical convenience a single set of arbitrary proportions has been assumed among the ratios for lower, upper and graduate division instruction; i.e., twice as many upper division students as graduate students per instructional staff member, and half again as many lower division students as upper division. These proportions are of no significance, however, for any practical application of Table III would almost inevitably require interpolation between various pairs of figures, no matter what proportions were used in the table's preparation.

TABLE III

Total Proposed Unit Floor Areas for Teaching Departments in Colleges and Universities

The total space listed in Table I, expressed in terms of floor area per student on the basis of various assumed student-faculty ratios.

ARTS	LANGUAGES AND LITERATURE	SOCIAL SCIENCES	BIOLOGICAL SCIENCES	MATHEMATICS	PHYSICAL SCIENCES	AGRICULTURE	ENGINEERING	OTHER PROFESSIONS	MILITARY SCIENCES	PHYSICAL EDUC.
1	2	3	4	5	6	7	8	9	10	11
A. Assuming one FTE faculty member or teaching assistant for every 15 FTE lower division students, one for every 10 FTE upper division students, and one for every 5 FTE graduate students:										
Net square feet per FTE lower division student:										
122	33	33	111	34	111	139	170	51	128	1,138*
Net square feet per FTE upper division student:										
155	45	45	149	47	149	201	248	75	161	139
Net square feet per FTE graduate student:										
218	76	76	271	90	271	332	354	145	—	251
B. Assuming one FTE faculty member or teaching assistant for every 30 FTE lower division students, one for every 20 FTE upper division students, and one for every 10 FTE graduate students:										
Net square feet per FTE lower division student:										
112	25	25	95	26	95	120	150	37	116	1,125*
Net square feet per FTE upper division student:										
140	35	35	125	36	125	174	217	55	145	120
Net square feet per FTE graduate student:										
186	54	54	223	66	223	276	292	106	—	213
C. Assuming one FTE faculty member or teaching assistant for every 45 FTE lower division students, one for every 30 FTE upper division students, and one for every 15 FTE graduate students:										
Net square feet per FTE lower division student:										
108	23	23	90	23	90	113	143	33	113	1,122*
Net square feet per FTE upper division student:										
134	30	30	117	31	117	164	207	48	139	113
Net square feet per FTE graduate student:										
175	46	46	208	58	208	257	271	92	—	201

* Based on the very rough approximation, 1,000 net square feet of teaching laboratory space per FTE lower division physical education student, referred to in footnote (a) of Table I.

TABLE IV

First Example of Application of Total Proposed Unit Floor Areas

Showing the application of Table III to a hypothetical 5,000-student campus with instruction at all levels in all general subject fields, with all departments arbitrarily assumed to have one FTE faculty member or teaching assistant for every 30 FTE lower division students, one for every 20 FTE upper division students and one for every 10 FTE graduate students. (Physical education is excluded from this example because of the unreliability of the proposed unit floor areas for lower division laboratory instruction in that subject.)

GENERAL SUBJECT FIELD	NUMBER OF FTE STUDENTS			NET SQ. FT. PER FTE STUDENT (Table III-B)	TOTAL NET SQUARE FEET		
	TOTAL	EACH DIVISION			DIVISION	TOTAL	PER FTE STUDENT
1	2	3		4	5	6	7
ARTS	500	Lower	250	112	28,000		
		Upper	200	140	28,000		
		Graduate	50	186	9,300	65,300	131
LANGUAGES AND LITERATURE	500	Lower	350	25	8,750		
		Upper	100	35	3,500		
		Graduate	50	54	2,700	14,950	30
SOCIAL SCIENCES	1,250	Lower	500	25	12,500		
		Upper	500	35	17,500		
		Graduate	250	54	13,500	43,500	35
BIOLOGICAL SCIENCES	500	Lower	150	95	14,250		
		Upper	250	125	31,250		
		Graduate	100	223	22,300	67,800	136
MATHEMATICS	250	Lower	150	26	3,900		
		Upper	50	36	1,800		
		Graduate	50	66	3,300	9,000	36
PHYSICAL SCIENCES	500	Lower	150	95	14,250		
		Upper	250	125	31,250		
		Graduate	100	223	22,300	67,800	136
AGRICULTURE	250	Lower	50	120	6,000		
		Upper	150	174	26,100		
		Graduate	50	276	13,800	45,900	184
ENGINEERING	500	Lower	100	150	15,000		
		Upper	300	217	65,100		
		Graduate	100	292	29,200	109,300	219
OTHER PROFESSIONS	500	Lower	50	37	1,850		
		Upper	150	55	8,250		
		Graduate	300	106	31,800	41,900	84
MILITARY SCIENCES	250	Lower	200	116	23,200		
		Upper	50	145	7,250		
		Graduate	0	—	0	30,450	122
ALL TEACHING DEPARTMENTS (Excl. Phys. Ed.)	5,000	Lower	1,950	65	127,700		
		Upper	2,000	110	220,000		
		Graduate	1,050	141	148,200	495,900	99

Tables IV, V and VI show three hypothetical applications of Table III. We assume the same somewhat arbitrary distribution of 5,000 students in Tables IV and V, but have used different student-faculty ratios. Although the effect on the amount of building space required for individual groups of departments is appreciable, the overall effect of these particular differences in student-faculty ratio is small. The overall effect of a significant uniform difference in the student-faculty ratios on two otherwise similar campuses would, of course, be greater.

Table VI is based on the same arbitrarily uniform student-faculty ratios as is Table IV, but here the hypothetical campus has only undergraduate students and offers no instruction in the general subject fields of agriculture, engineering, other professions and the military sciences. The undergraduate teaching loads in other subject fields are assumed to be the same as in Tables IV and V. The first institution might be a fully developed university; the second, though with high student-faculty ratios for such purposes, might be a liberal arts college. The difference in the overall space requirements is considerable in these instances.

Tables IV, V and VI illustrate the ease with which a standardized set of unit floor areas and student-faculty ratios would permit the overall space requirements of a college or university to be estimated with reasonable accuracy. They also demonstrate the

TABLE V

Second Example of Application of Total Proposed Unit Floor Areas

Showing the application of Table III to the same hypothetical 5,000-student campus as in Table IV, but with student-faculty ratios corresponding to different parts of Table III.

GENERAL SUBJECT FIELD	NUMBER OF FTE STUDENTS			NET SQ. FT. PER FTE STUDENT*	TOTAL NET SQUARE FEET		
	TOTAL	EACH DIVISION			DIVISION	TOTAL	PER FTE STUDENT
1	2	3		4	5	6	7
ARTS (Table III-B)	500	Lower	250	112	28,000		
		Upper	200	140	28,000		
		Graduate	50	186	9,300	65,300	131
LANGUAGES AND LITERATURE (Table III-B)	500	Lower	350	25	8,750		
		Upper	100	35	3,500		
		Graduate	50	54	2,700	14,950	30
SOCIAL SCIENCES (Table III-C)	1,250	Lower	500	23	11,500		
		Upper	500	30	15,000		
		Graduate	250	46	11,500	38,000	30
BIOLOGICAL SCIENCES (Table III-B)	500	Lower	150	95	14,250		
		Upper	250	125	31,250		
		Graduate	100	223	22,300	67,800	136
MATHEMATICS (Table III-B)	250	Lower	150	26	3,900		
		Upper	50	36	1,800		
		Graduate	50	66	3,300	9,000	36
PHYSICAL SCIENCES (Table III-A)	500	Lower	150	111	16,650		
		Upper	250	149	37,250		
		Graduate	100	271	27,100	81,000	162
AGRICULTURE (Table III-A)	250	Lower	50	139	6,950		
		Upper	150	201	30,150		
		Graduate	50	332	16,600	53,700	215
ENGINEERING (Table III-A)	500	Lower	100	170	17,000		
		Upper	300	248	74,400		
		Graduate	100	354	35,400	126,800	254
OTHER PROFESSIONS (Table III-C)	500	Lower	50	33	1,650		
		Upper	150	48	7,200		
		Graduate	300	92	27,600	36,450	73
MILITARY SCIENCES (Table III-A)	250	Lower	200	128	25,600		
		Upper	50	161	8,050		
		Graduate	0	—	0	33,650	135
ALL TEACHING DEPARTMENTS (Excl. Phys. Ed.)	5,000	Lower	1,950	69	134,250		
		Upper	2,000	118	236,600		
		Graduate	1,050	148	155,800	526,650	105

*Based on various parts of Table III, as indicated in column 1.

fallacy of the common assumption that such requirements can be estimated without regard for the distribution of teaching loads among subject fields and levels of instruction. Of the three examples Table V represents the least arbitrary selection of student-faculty ratios. An examination of column 4 in Table V should convince anyone that a university's overall space requirements will be significantly affected by any appreciable change in the relative amounts of lower, upper and graduate division instruction. A glance at column 7 should impress anyone with the fact that a significant change in the relative amount of instruction in any one of the general subject fields will affect the overall space requirements, for here is one of those interesting cases in which the overall average is not representative of a single component part.

Standards for Other College Buildings

Although our studies have been directed primarily at the determination of unit floor areas for buildings occupied by teaching departments, we have developed a few rules-of-thumb applicable to other types of building space. In the planning of libraries we find that about one-tenth net square foot per volume will provide the proper total floor area for book stacks and library staff workrooms and offices; and that approximately 30 net square feet per station will adequately accommodate the reading rooms and related facilities.

TABLE VI

Third Example of Application of Total Proposed Unit Floor Areas

Showing the application of Table III to a hypothetical campus with the same lower and upper division teaching loads in the arts, languages and literature, social sciences, biological sciences, mathematics and physical sciences as in Tables IV and V, but with no instruction in agriculture, engineering, other professions or the military sciences; with no graduate instruction; and with all departments arbitrarily assumed to have one FTE faculty member or teaching assistant for every 30 FTE lower division students, and one for every 20 FTE upper division students, as in the example in Table IV. (Physical education is excluded from this example, as from those in Tables IV and V, because of the unreliability of the proposed unit floor areas for lower division laboratory instruction in that subject.)

GENERAL SUBJECT FIELD	NUMBER OF FTE STUDENTS			NET SQ. FT. PER FTE STUDENT (Table III-B)	TOTAL NET SQUARE FEET		
	TOTAL	EACH DIVISION			DIVISION	TOTAL	PER FTE STUDENT
1	2	3		4	5	6	7
ARTS	450	Lower	250	112	28,000		
		Upper	200	140	28,000	56,000	124
LANGUAGES AND LITERATURE	450	Lower	350	25	8,750		
		Upper	100	35	3,500	12,250	27
SOCIAL SCIENCES	1,000	Lower	500	25	12,500		
		Upper	500	35	17,500	30,000	30
BIOLOGICAL SCIENCES	400	Lower	150	95	14,250		
		Upper	250	125	31,250	45,500	114
MATHEMATICS	200	Lower	150	26	3,900		
		Upper	50	36	1,800	5,700	29
PHYSICAL SCIENCES	400	Lower	150	95	14,250		
		Upper	250	125	31,250	45,500	114
ALL TEACHING DEPARTMENTS	2,900	Lower	1,550	53	81,650		
		Upper	1,350	84	113,300	194,950	67

For example, a library building housing 150,000 volumes and providing 500 reading and study stations will require a total floor area of approximately 30,000 net square feet.

In the planning of academic and administrative offices, we find that almost any type of office operation is satisfactorily accommodated if the layout of furniture and other equipment is such that 30 to 35 percent of the total floor area in each room is actually covered by desks, chairs, tables, file cabinets, shelves and other equipment, including any office or accounting machines which occupy floor space. In other words, the space requirements of almost any type of office—excluding, of course, those in which square feet may reasonably be provided as a symbol of prestige—can be accurately estimated in terms of net square feet by, first, listing all the furniture and other equipment required for the projected functions of each office; second, computing the square feet of floor space actually covered by such furniture and equipment; and, third, multiplying the total number of "covered" square feet by three. For example, in terms of round-number approximations, a 30-inch by 60-inch desk and a 30-inch by 60-inch work table (25 square feet), a swivel armchair (4 square feet), three side chairs (2 square feet each), two file cabinets (3 square feet each), and three 3-foot sections of book shelves (1 square foot per lineal foot) will cover a total of 50 square feet and cannot be satisfactorily arranged in an office of much less than 150 square feet.

NEW JERSEY PREPARES TO MEET THE DEMAND FOR MORE TEACHERS



by CLEVE O. WESTBY

Coordinator, State Teachers Colleges Construction Program, New Jersey Department of Education

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THE people of New Jersey have approved a $15,000,000 bond issue to enlarge and improve the six state teacher's colleges. This action was prompted by recognition of the fact that New Jersey cannot continue to recruit enough teachers for its elementary and secondary schools unless there is an increase in the sources of supply, and that the only source which the state can control directly is its state teachers colleges. If these six institutions, which are now limited in the number of teachers they can prepare, can have their facilities increased and improved, more young men and women undoubtedly will be attracted to them.

This approach to the problem was reached after intensive study of population trends, school enrollment trends, trends in supply and demand for teachers, existing facilities at the six teachers colleges, ease of commuting to the several colleges, the need for dormitories, the feasibility of merging and relocating curricula, and the buildings needed if the required numbers of new teachers were to be properly prepared. Instrumental in making these studies were the State Board of Education, the Commissioner of Education and the staff of the Division of Higher Education.

Guidance in making the studies and evaluating the data was provided by such recognized leaders in the field of teacher education as Dr. E. S. Evenden, Professor Emeritus, Columbia University, and R. W. Earl Armstrong, Chief of Teacher Education in the United States Office of Education. Each teachers college was visited, problems discussed and data evaluated by Dr. Clyde A. Erwin, Superintendent of Public Instruction for North Carolina; Dr. Thomas E. Pullen, Jr., State Superintendent of Public Instruction for Maryland; and Herbert D. Welte, President, Connecticut State Teachers College at New Britain.

Growing Need for Teachers

The problem of teacher recruitment in New Jersey stems from three major factors: (1) the normal replacement due to teachers entering other occupations, death, retirement, failing to be offered reemployment and dropping out of the profession for other reasons; (2) the increased demand for teachers occasioned by the rising enrollments resulting from a high birth rate since the war; and (3) New Jersey's rapid industrial expansion and consequent in-migration of thousands of new families annually. (Transfers of teachers to other school districts in the state are not included in the data presented.)

During the five-year period from 1947–48 to 1951–52, an average of 225 teachers in the public schools of New Jersey accepted teaching positions in other states, 220 left the profession to enter other occupations, 318 died or retired, 236 were not offered

reemployment and 1,002 dropped out for other reasons. If the current trend continues, New Jersey will need to replace an average of 2,001 teachers annually for the above reasons, of whom about 1,404 will be needed in grades kindergarten through eight, and 597 in grades nine through twelve. This is equivalent to an average of 6.4 percent of the total number of teachers employed in the state.

The increased birth rate, which currently results in about 100,000 live births annually, will cause school enrollments to rise to more than 800,000 by 1955, as compared to 720,000 in 1951–52. It is estimated that the total enrollment will exceed 900,000 by 1960 and approach the million mark by 1965. These anticipated enrollment increases will require about 825 additional teachers annually for the next seven or eight years, most of whom will be needed in the elementary grades since high school enrollments are not expected to rise appreciably until after 1955. On the basis of past experience these estimates undoubtedly will prove to be very conservative.

Estimated increases in population due to the rapid expansion of industry in the state range from 6,250 to 25,000 annually. If the lower figure is used, these residents will bring with them an average of 862 children of school age each year. (The 1950 U. S. Census indicates that 13.8 percent of the population of New Jersey consists of children in the 5 to 14 year bracket.) Thirty additional teachers will be needed annually to care for the children of these new residents.

If the above assumptions may be accepted, New Jersey then will need about 2,850 new teachers annually for the next ten years.

Sources of Teacher Supply

Where are these teachers to come from? During the five-year period ending June 30, 1952, New Jersey had recruited an average of 2,344 teachers annually from five major sources, namely: New Jersey colleges other than the six state teachers colleges, colleges in other states, school districts in other states, non-teaching occupations and the six New Jersey state teachers colleges. The number of teachers now supplied by each source and the estimated future supply are indicated in the accompanying table.

Other than the six state teachers colleges, it is highly improbable that any of these sources of teacher supply can be increased appreciably. With the demand for additional teachers growing in practically every section of the country, the number which can be attracted to New Jersey from out-of-state colleges or from school districts in other states may even be reduced. It is doubtful that the nine colleges in New Jersey, other than the state teachers colleges, will supply any more teachers annually than they do at present. Enrollments are dropping in practically all of these colleges and with the prospect of relatively small high school graduating classes for the next decade, enrollments probably will not increase appreciably during that time.

Teacher Recruitment Sources in New Jersey

Sources	Average number of teachers supplied annually from 1947–48 to 1951–52*	Average number of teachers anticipated annually when construction program is completed
1. Nine colleges in New Jersey other than the six state teachers colleges	190	195
2. Colleges in other states	507	510
3. School districts in other states	309	310
4. Other occupations**	724	485
5. Six New Jersey state teachers colleges	614	1,350
Totals	2,344	2,850

* Based on studies made annually since 1937.
** Includes homemakers, military personnel and others, of whom some are former teachers or are properly certificated. Many are so poorly qualified, however, that their employment can be justified on an emergency basis only. In 1951–52 there were 2,277 persons teaching in New Jersey on substandard or emergency certificates.

Additional teachers can no doubt continue to be obtained from other occupational groups. Many of these have rendered and will continue to render excellent service but, by and large, there are comparatively few recruits from this source who can be regarded as well qualified. If the number of teachers with substandard or emergency certificates is to be reduced, then recruits from non-teaching occupations must be screened more carefully in the future. This means that fewer teachers can be obtained from this source.

Where the above sources have supplied an average of 1,730 teachers annually for the last five years, it is estimated that no more than 1,500 can be expected in the future. The additional 1,350 must then be recruited through the medium of the six state teachers colleges. In their recommendations to the State Legislature, the Commissioner of Education and the State Board of Education stated, "The single remaining source of teacher supply is the state's own teacher training institutions. In these colleges its control is complete. It can expand or limit enrollments. It can establish or abolish courses of study. It can control the quality of graduates. It seems logical for the state to depend on these colleges to educate the number of teachers needed in addition to those well-qualified teachers who can be recruited from other sources."

A Plan for Increased Facilities

To determine the most effective use which could be made of the $15,000,000 bond issue a committee representing the Commissioner of Education, the State Board of Education, the Division of Higher Education and the six state teachers college presidents analyzed the needs and possibilities at each of the colleges.

After almost a year of work in which they were assisted by consultants and architects, they submitted a plan which included adjustments in the curricular offerings of the several colleges, new construction and improvements to existing buildings. On November 7, 1952, the State Board of Education gave its unanimous approval to the plan. This plan is based on the following premises:

"The State Teachers Colleges in order to attract and hold students of high ability must have:

a. Superior faculties.

b. A challenging program of studies.

c. Campuses located within commuting distances of a high percentage of the homes of the students. This is in agreement with the policy of the State University of placing college units in locations where the demand for services is sufficiently high to insure economy in administration.

d. Campuses which will appeal to students and enable the teachers colleges to compete successfully with other colleges.

e. Modern buildings and equipment suitable for teacher education and adequate for the numbers to be enrolled.

f. Dormitories operated at low cost for students whose homes are beyond commuting distances.

"That the following principles shall guide the development program:

a. While priority should be given to construction which will make possible increased enrollments, at the same time the need to replace obsolescent and inadequate facilities must be given proper consideration.

b. The investment in facilities now usable and worthy of reconstruction should be conserved as fully as is consistent with attaining the necessary number of teachers with high qualifications.

c. That, wherever practical, closely related curriculums should be offered in the same college in order that each may contribute to the other.

d. That a curriculum offered in but one college should be located on a campus where there are both dormitory and commuting facilities.

e. The extent of the facilities provided on any

Curriculums Recommended for the New Jersey State Teachers Colleges[1]

Curriculums	Suggested Freshman Enrollment at:							Probable Number of Graduates*
	Glassboro	Jersey City	Montclair	Newark	Paterson	Trenton	All Colleges	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Kindergarten—Primary	70	70		70	70	70	350	298
General Elementary	120	70		120	105	70	485	413
Grades 5-9	40	40		40	40		160	136
Sub-total Elementary	230	180		230	215	140	995	847
Business Education			35			35	70	60
English			70**				70**	60**
English—History						35**	35**	30**
Fine Arts			20				20	17
Foreign Languages			25				25	22
Health Education & Nursing		30					30	25
Health & Physical Education						50	50	43
Home Economics			35				35	30
Industrial Arts			20			20	40	34
Mathematics			35**				35**	30**
Music			15			15	30	25
Science			30**				30**	25**
Science—Mathematics						20**	20**	17**
Social Studies			70**				70**	60**
Social Studies—Geography						30**	30**	25**
Sub-total Secondary		30	355			205	590	503***
Recommended Freshman Enrollment Goal	230	210	355	230	215	345	1,585	
Recommended Total Enrollment Goal	800	730	1,235	800	750	1,200	5,515	
Probable Number of Graduates	196	179	302	196	183	294		1,350***

* Numbers in this column have been rounded to make the total exact.

** Graduates of these academic curriculums will have taken courses which will enable them to be certificated to teach in either the secondary or the elementary grades.

*** Of this number, approximately 247 graduates of academic curriculums will be certificated to teach in either the secondary or elementary grades.

[1] Page 28. "A Plan for the Development and Expansion of the New Jersey State Teachers Colleges."



Campus of the State Teachers College at Glassboro, New Jersey. The new buildings to be constructed are: 1. Laboratory School; 2. Men's Dormitory; 3. Food Service and Student Union Building; 4. Women's Dormitory; and 5. Library. The temporary wooden structures on the campus will be removed.

campus should be limited by the number of graduates needed for specific positions; the variety of curriculums offered on that campus; and the probable number of students who can be recruited to enroll in specific curriculums in the college concerned."

The plan, which was approved by the State Legislature and the Governor in January, 1953, provides for the allocation of the proceeds from the $15,000,000 bond issue to the six colleges for the construction of the following projects:

At Glassboro		
A food service building	$ 400,000	
A library	450,000	
Two dormitories	779,000	
A demonstration school	579,000	
Total		$ 2,208,000
At Jersey City		
A physical education building	$ 525,000	
An addition to the library	242,000	
Converting existing gymnasium to classrooms, offices and storage	150,000	
Total		$ 917,000
At Montclair		
A food service and auditorium building	$1,150,000	
A physical education building	726,000	
A classroom building	1,400,000	
Two dormitories	1,275,000	
Remodeling of administration building to increase library facilities	123,000	
Enlarge heating plant	100,000	
Total		$ 4,774,000
At Paterson		
An addition to the food service building	$ 220,000	
A physical education building	525,000	
A library	450,000	
Additional classrooms	105,000	
Total		$ 1,300,000
At Trenton		
A food service building	$ 666,000	
A women's dormitory	1,275,000	
Enlarge heating plant	100,000	
Total		$ 2,041,000
At Newark		
Buildings as required on new campus		$ 3,700,000
Miscellaneous Expense		$ 60,000
Total		**$15,000,000**

Estimates of the cost of each project were made after consultation with architects well acquainted with each college and the factors in each area which would affect construction costs. Changes in the allocation of funds for specific projects on any one campus may be made by the Commissioner of Education and the State Board of Education, but transfers of any of the funds from one college to another may be done only by the State House Commission.

Responsibility for the Program

The responsibility for carrying forward the program of construction at the state teachers colleges lies with the State Board of Education, the Commissioner of Education and the Director of the Division of Purchase and Property. One of the first steps taken by these agencies, after the State Legislature had ap-

proved the plan referred to above, was the appointment of the architects for the projects specified in the plan. These architects were selected on the basis of their understanding of the problems at the respective colleges and the degree to which work on other state financed projects had been satisfactorily performed by them. Two architectural firms had previously designed buildings on the campuses to which they are now assigned.

A Coordinator for Construction

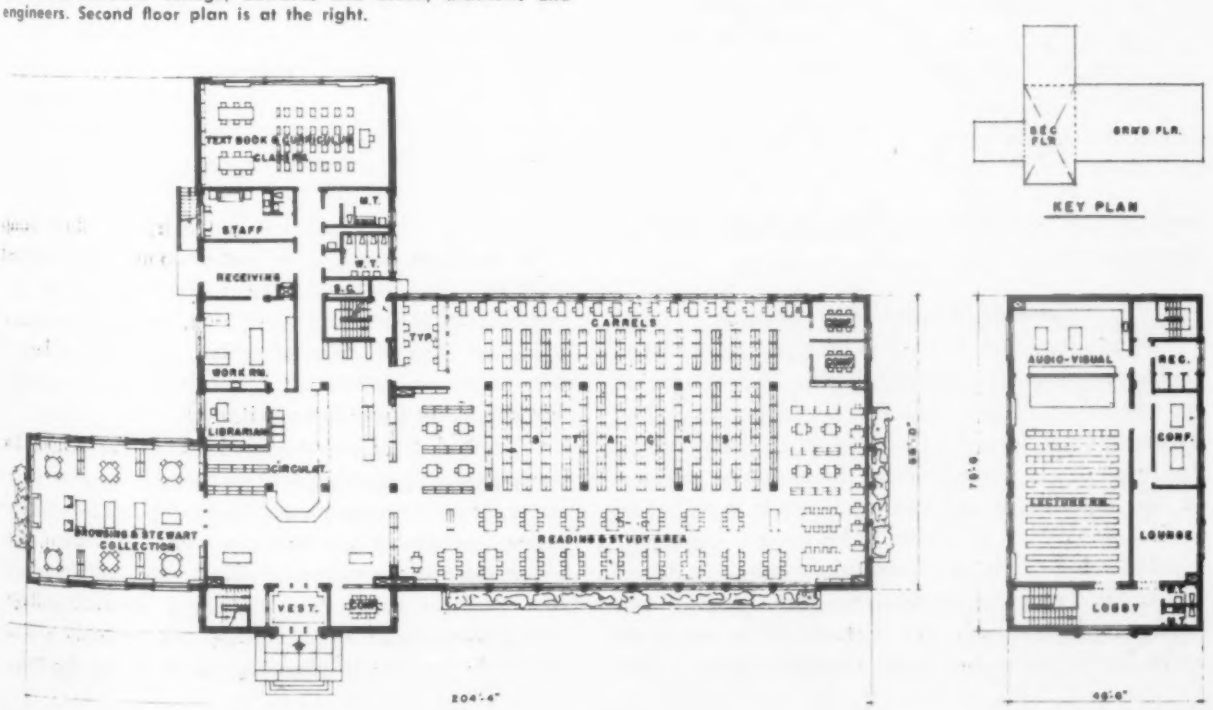
It was early evident that the manifold duties of the Commissioner of Education and the Assistant Commissioner for Higher Education would make it impossible for either to devote enough time to the teachers colleges construction program to provide the direction required. Accordingly, with the approval of the State Board of Education, the Commissioner of Education appointed a coordinator whose duties are to work with the respective college presidents, the college planning committees, the Assistant Commissioner for Higher Education, the architects, the Director of the Division of Purchase and Property, the Commissioner of Education and the State Board of Education. The coordinator assists in setting up a budget for each project, determining a site for each building, preparing a statement of requirements for each building, analyzing the architects' plans, selecting equipment and supervising the construction. A genuine desire to work together in the effort to obtain buildings well adapted to their purposes has characterized the entire program.

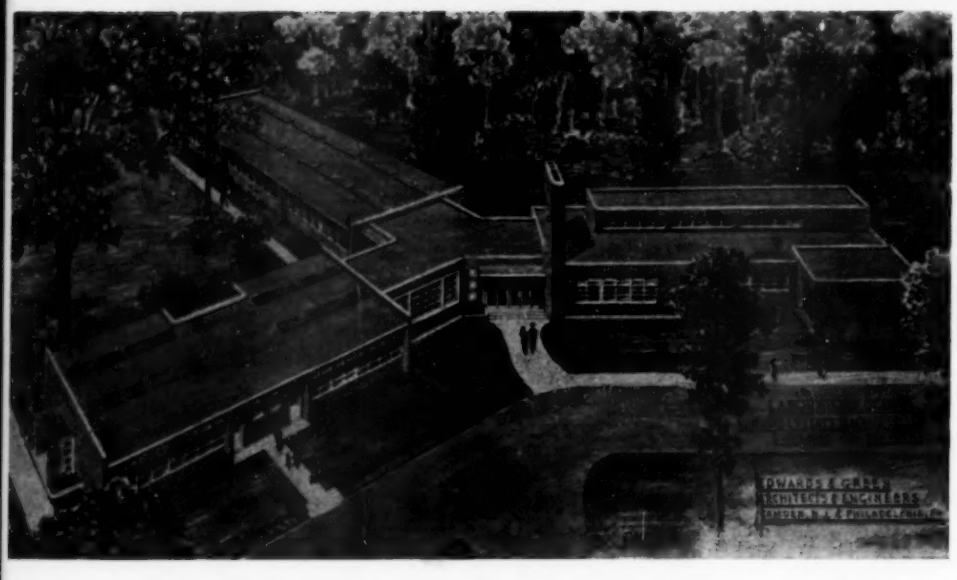
Provisions for Dormitories

Dormitories are to be constructed at three of the state teachers colleges: one for 100 men and one for 100 women at Montclair; one for 50 men and one for 100 women at Glassboro; and one for 200 women at Trenton. For a number of reasons it seemed desirable to provide facilities for students at each of these colleges which would be similar in quality and in kind. It appeared also that it would be less costly to furnish these buildings if all of the equipment required might be more or less standardized. The presidents of the colleges in question, the deans concerned with student housing, and the architects met in March, 1953, to determine requirements for dormitories which would apply on each campus. From this conference came agreements covering room areas, size of clothes closets, room trim, floor coverings, types of windows, the corridor widths, bath and toilet facilities, storage, telephone service, study rooms, lounges, recreation rooms, laundry facilities, guest accommodations, quarters for employees and wall and ceiling finishes.

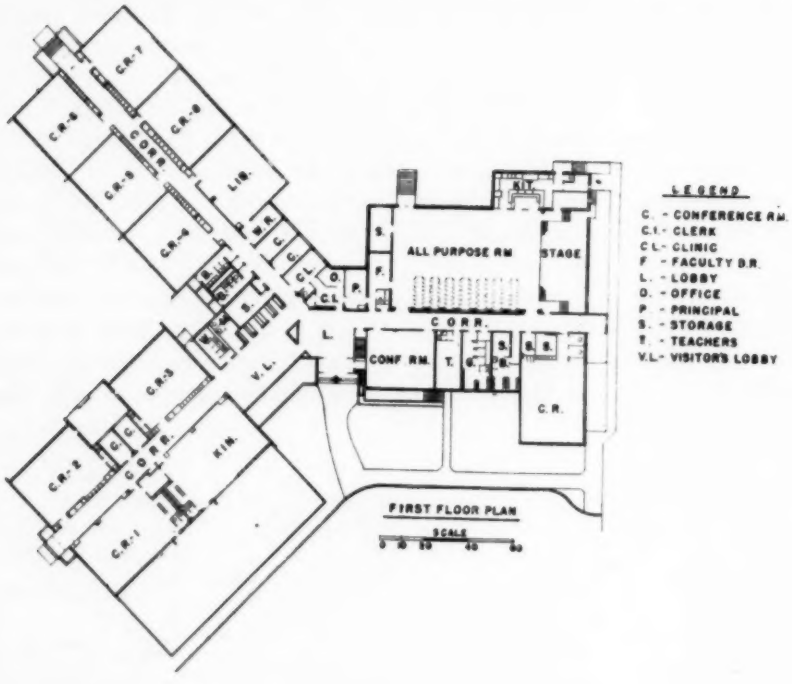
It had been expected that this conference would result in the decision to have student rooms on all campuses with exactly the same dimensions. Though there was general agreement on the area, the actual dimensions desired by the different architects and campus planning committees varied. Thus at one college the double rooms would be 13 feet 0 inches by 15 feet 0 inches, 11 feet 8 inches by 16 feet 0 inches at the second, and 11 feet 8 inches by 16 feet 6 inches at the third. To some extent the dimensions were dic-

Below is the ground floor plan of the library building for the Glassboro Teachers College, Edwards and Green, architects and engineers. Second floor plan is at the right.





The Laboratory School building to be constructed at the State Teachers College at Glassboro. Edwards and Green, Camden, New Jersey, are the architects.



First floor plan of the Laboratory School at Glassboro State Teachers College. The new school will have an enrollment of approximately 240 pupils from Glassboro and other neighboring districts.

tated by the type of construction which the architect planned to use.

Sample Rooms Are Built

It was therefore decided to have mock-ups of two double rooms, one 13 feet 0 inches by 15 feet 0 inches and the other 11 feet 8 inches by 16 feet 0 inches, constructed and completely furnished to make certain that each could accommodate the furniture planned for the dormitories and that each would have a desirable amount of flexibility. The rooms were constructed side-by-side in a large classroom in a school building in Trenton. One room was furnished with two "Hollywood" type beds, two dressers, 19 inches by 30 inches by 42 inches, two desks, 24 inches by 42 inches, two straight chairs, one lounge chair, one floor lamp and two desk lamps. The other room was outfitted with two twin beds with head and foot boards, two combination desk and dresser units, two student chairs, a lounge chair, a floor lamp and two student lamps. Closets or wardrobes were not built-in or installed, but spaces for these were indicated.

Invited to a conference held at the school for the purpose of viewing the rooms and agreeing on as many items concerned with them as possible were the college presidents, the deans of men and women, dormitory matrons, resident teachers, the architects and four students living in a dormitory at each college. This proved to be an interesting and certainly a most profitable venture in planning. After all of the furni-

ture had been rearranged a good many times and moved from one room to the other, and consideration given to locations of the closets and entrance doors, number and size of windows, hanging of pictures, mirrors and shelves, lighting, ventilation, floor coverings, the kind of desks, dressers, beds, chairs, size and arrangement of the closets, and the number and location of electrical outlets, the following points were agreed upon:

1. **Room Dimensions.** Since it was found that each room had about the same flexibility and could accommodate the furniture agreed upon, room dimensions were left as proposed for each college.
2. **Entrance Doors.** The doors are to be located 2 feet 4 inches from one side of the room. This permits locating closets along that wall and placing a standard bed along the corridor wall if desired.
3. **Windows.** Each double room is to have three windows extending across the entire end of the room. If the projected type of sash is used, the lower two-thirds of the center window will be operable and screened.
4. **Closets.** The closets will be 24 inches by 42 inches. The clothes pole will be high enough in girls' rooms to permit hanging party gowns so they will not drag on the floor. There is to be a storage space above the closet extending to the ceiling. (Movable wardrobes were considered but were not regarded as contributing enough flexibility to warrant their use.)
5. **Picture Mold.** There will be a screed type picture mold around the entire room six feet from the floor which will permit hanging pictures, mirrors and shelves without the use of wires.
6. **Beds.** The beds will be 36 inches wide and of the "Hollywood" type without head or foot boards, each mounted on a steel dolly equipped with large metal glides.
7. **Dressers.** The dressers are to be 30 inches wide, 19 inches deep and 42 inches high, have four drawers and a closed base. The top should be of formica or its equivalent.
8. **Desks.** The desks will be 24 inches by 42 inches. One pedestal shall have a shallow drawer and two deep drawers. Just beneath the shallow drawer there will be a pull-out board on which a typewriter may be placed. The other pedestal is to consist of shelves for books. The top should be of formica or its equivalent.
9. **Lounge Chair.** The lounge chair with loose seat and back cushions, preferably of foam rubber, will have a separable cover of a fabric which may be laundered when soiled. The arms are not to be upholstered.
10. **Outlets.** There will be one double electrical outlet near the center of each wall.
11. **Lighting.** A semi-recessed electrical fixture will be placed in the center of the ceiling.
12. **Heating.** The radiators should be recessed.

There was no agreement on whether the windows would have shades, Venetian blinds or drapes. There was no agreement either on whether the furniture should be steel or wood. Steel will probably be selected if prices are comparable with those for wood furniture of good quality.

There is a good possibility that room walls will not be plastered. In this event the interior walls of light-weight concrete block will be painted, as would the ceilings in the structures, using a poured concrete floor and ceiling slab. Where structural concrete plank is used the ceilings probably will be plastered.

The Six State Teachers Colleges

The six New Jersey state teachers colleges are located at Glassboro, Jersey City, Montclair, Newark, Paterson and Trenton. The curriculums at Glassboro, Newark and Paterson will be identical and will cover the requirements for teachers in grades kindergarten through nine. The curriculums at Jersey City will be the same with the exception of the program in health education and nursing. The college at Montclair will offer programs for secondary teachers only, while at Trenton students may prepare for either elementary or secondary teaching careers.

State Teachers College at Glassboro

The State Teachers College at Glassboro is located on a beautiful, heavily wooded site of 77 acres, the former estate of Thomas Whitney of glassmaking fame. The present structures include the administration building, two women's dormitories accommodating 140 women students, a greenhouse, the president's house (former Whitney residence), a temporary wooden six-classroom building and several small frame dwellings erected for 30 G.I. students and their families. The administration building contains offices, 23 classrooms, an auditorium, a small gymnasium and very inadequate facilities for library and food service.

There are about 500 full-time students enrolled of whom 60 percent commute by car, many for considerable distances. More would live on the campus if facilities were available.

There are not enough classrooms. Some of the children enrolled in the demonstration school are housed in the administration building, others in the temporary frame classroom building. A good program of education for children is impossible under these conditions.

The building program at Glassboro calls for a library building, a demonstration school, a food service building, a dormitory for 100 women students and another for 50 men. A new physical education plant,

while badly needed, must wait until more funds are available.

Library of the School

The library, to house about 70,000 volumes and provide space for 150 student stations, will also have a small auditorium for conference purposes, audio-visual instruction facilities, a combination browsing and treasure room in which will be kept the Frank Stewart collection of colonial and early New Jersey State documents and a curriculum materials classroom. In response to the advice that this library must be highly utilitarian in character, as flexible as possible, easily expanded and economical to construct and maintain, the architects have combined the stack room, reading room, reference room, periodicals room, carrels and student conference rooms into one large area which is laid out on a 22½-foot module. This permits three-foot stack sections to be placed either crosswise or lengthwise of the structure without waste of space. The floor has load carrying characteristics which allow stacks to be placed anywhere, thus permitting the several elements in the main part of the structure to be located as needs dictate.

Like all library facilities planned at this time for the colleges, this library will have the necessary duct work built in for the future installation of air conditioning equipment.

The Demonstration School

Arrangements are being made with Glassboro and other neighboring school districts to care for 240 pupils in the new demonstration school, of whom 25 will be enrolled in each grade from kindergarten through eight and about fifteen in the program for handicapped children. The new school will be located about 200 feet north of the administration building on the edge of a level and well developed ten-acre playfield used currently for the physical education program of the college. A new field for this latter purpose is to be provided on land adjacent to the campus.

The "Y" shape of the demonstration school is the result of an effort to locate the building in the wooded portion of the campus without encroaching on the playfield and to avoid a ravine. The "Y" shape proved the most economical of any of several layouts, requiring about 1,000 less square feet of floor area and shorter water, heating and electrical lines. It also permits having four distinct areas, the administrative at the center, the lower or primary grades in the left front wing, the upper grades in the rear left wing and the all-purpose room, the program for the handicapped children and food service in the right wing.

There will be nine classrooms for grades kindergarten through eight; a classroom designed for the handicapped children's program; and an all-purpose room with "in-wall" tables, a serving kitchen, stage and dressing rooms with shower facilities; four small rooms for testing and small student conference groups; one large conference room; principal's office; assistant principal's office; library; nurse's room; visitors' lounge; cloak rooms for students; teachers' room, toilet rooms and cloak rooms.

The building has been designed to give children a normal school environment, though its primary purpose is to facilitate teacher training. Since the classrooms must accommodate as many as thirty student observers in addition to the twenty-five children, the rooms are considerably larger than average, being 25 feet by 35 feet. Fifteen to sixteen of the student observers will be seated on a built-in bench along the window wall. The remainder will be seated on folding



This Administration and Classroom Building at the State Teachers College at Jersey City was constructed during 1927–1929.





Physical Education Building which will be constructed at the State Teachers College at Jersey City. Frank Grad and Sons and Harris K. Smith are the architects. Floor plan is at left.

chairs which will be stored on a chair cart in a closet when not in use. The students will occupy about 210 square feet of floor area, leaving 770 square feet for the teacher and pupils, or about 30 square feet per child.

Observation Facilities

Placing the student observers in booths behind one-way vision glass was considered originally. The sound would have been transmitted electronically. The difficulty of seating thirty students so that each could see all that was taking place, the uncertainty of good sound transmission and the cost involved forced abandonment of the idea. One-way vision glass will be installed so that visitors may view the activities in the kindergarten room from the visitors' lounge. Such glass will also be installed between the two pairs of small conference rooms so that these may be used to permit small groups of students to observe pupil testing. Conduits are to be installed for the use of closed-circuit television in the future thus permitting observation of classroom activities by students assembled either in the larger conference room or the all-purpose room.

Other features of the building, dictated by the teacher education program, are the conference rooms, the cloak rooms and toilet rooms for students and the visitors' lounge. Also, wardrobe lockers are in the corridors rather than in the classrooms. One reason for this is that many feel this arrangement is more desirable generally. Another is to free as much wall space in the classroom as possible. This is particularly important with student observers occupying one side of the room.

Since this is a school building constructed by the State Board of Education, it will be regarded by many



Kunkel

Campus of the State Teachers College at Montclair, New Jersey. The new buildings to be added to the campus are: 1. Men's Dormitory; 2. Auditorium-Food Service Building; 3. Classroom Building; 4. Physical Education Building; 5. Women's Dormitory. Temporary wooden buildings now in use will be removed.

as what the State Department of Education believes an elementary school should be. Due consideration for this fact has made it important that the building be adapted as nearly as is practicable to all of the needs of children and that it be designed for economical construction and maintenance. Features which are designed to facilitate the educational program and to provide a good environment for children include:

1. Large, light classrooms (28 feet by 35 feet).
2. All furniture and fixtures are movable including desks, counters, storage units and easels. The only permanently installed classroom unit is the sink.
3. Good lighting. Windows will run full length of the rooms without large mullions. Skylights, employing glass block, will tend to make natural illumination more uniform. For dark days supplementary illumination will be provided to guarantee a minimum of 30 foot-candles of light on each working surface. Light-colored translucent drapes will be used for light control. Dark drapes will be used for visual aids purposes.
4. Adequate heat. The air will be warmed in the

unit ventilators and distributed into the room along the entire length of the window to eliminate the "cold-wall" effect of the large windows. Coils will be placed in the floors of the kindergarten and first grade rooms for the purpose of warming the floors but not as a primary source of heat.

5. Adequate ventilation. Air will be brought into the rooms through unit ventilators. Air will be exhausted by gravity.

6. Acoustics. All rooms, corridors, offices and other occupied space will be acoustically treated to reduce undesirable noise and assure a good environment for listening.

7. Sanitary facilities. The kindergarten, first, second and third grade rooms will each have its own toilet, drinking fountain and lavatory facilities. There will be both hot and cold water and a sink in every room. Showers and dressing rooms will be provided for pupils using the all-purpose room for physical education.

8. Color. All walls, ceilings, chalkboards, trim, furniture and floors in classrooms will be in colors designed to yield the appropriate light reflectance in each room with due consideration for room orientation.

Features which are expected to keep construction costs and maintenance costs low include:

1. Floors of precast concrete plank carried on concrete beams. The uneven ground makes a concrete slab on the ground impracticable.

2. Roofs of prefabricated light concrete plank carried on bar joists.

3. Non-loadbearing walls. The roof will be supported by steel columns. The walls will be of light aggregate concrete block with brick veneer on exterior walls. Walls will not be plastered.

4. Aluminum sash.

5. Asphalt tile in all rooms. The corridors will probably have vinyl plastic floor covering.

6. Simplicity of style and absence of features designed for architectural effect only.

Food Service Building

The new food service building will include a main dining room seating 400 students, a faculty dining room, two small dining rooms, a kitchen, a large lounge, a student store, a recreation room, a snack bar, student association offices, office for the dean of students, a home economics suite and necessary auxiliary facilities. The large dining room, which will be used for dancing and other activities, the lounge, the recreation room and the snack bar will provide a center for student social life on the campus. The future installation of air conditioning equipment will be provided for by having the necessary duct work built in.

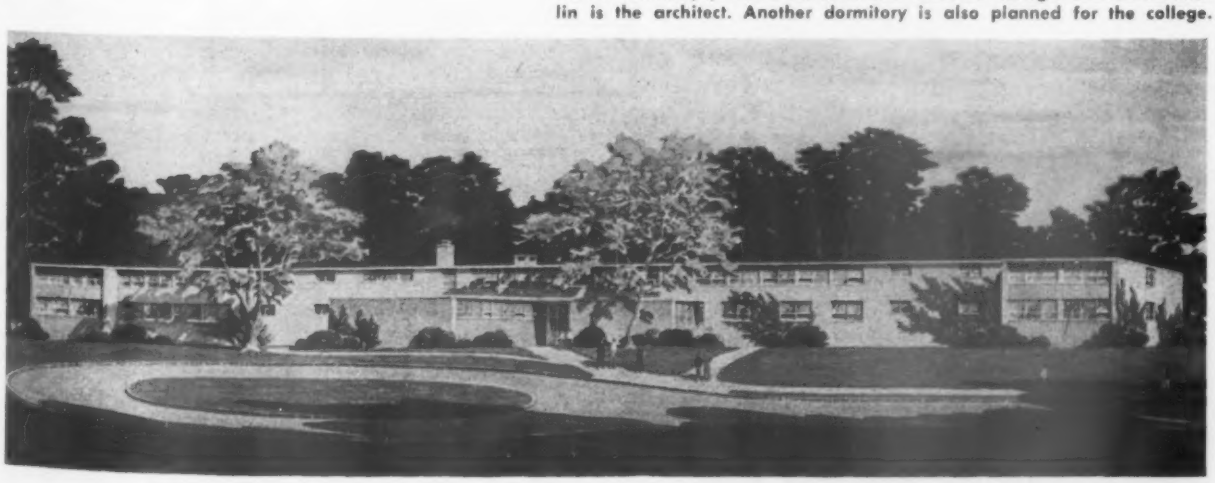
Both dormitories will conform to the above-mentioned specifications.

Teachers College at Jersey City

The physical plant of the State Teachers College at Jersey City consists of one large and unusually fine building on a 10-acre site. There are 28 classrooms and laboratories, an excellent auditorium and a cafeteria. The library is much too small. The gymnasium, actually an extension of the stage, and the dressing room facilities are definitely sub-standard. There are not enough classrooms to implement the contemplated program. Construction work on this campus will include an addition to the library, a physical education building and conversion of the existing gymnasium and dressing rooms to classrooms, offices and storerooms.

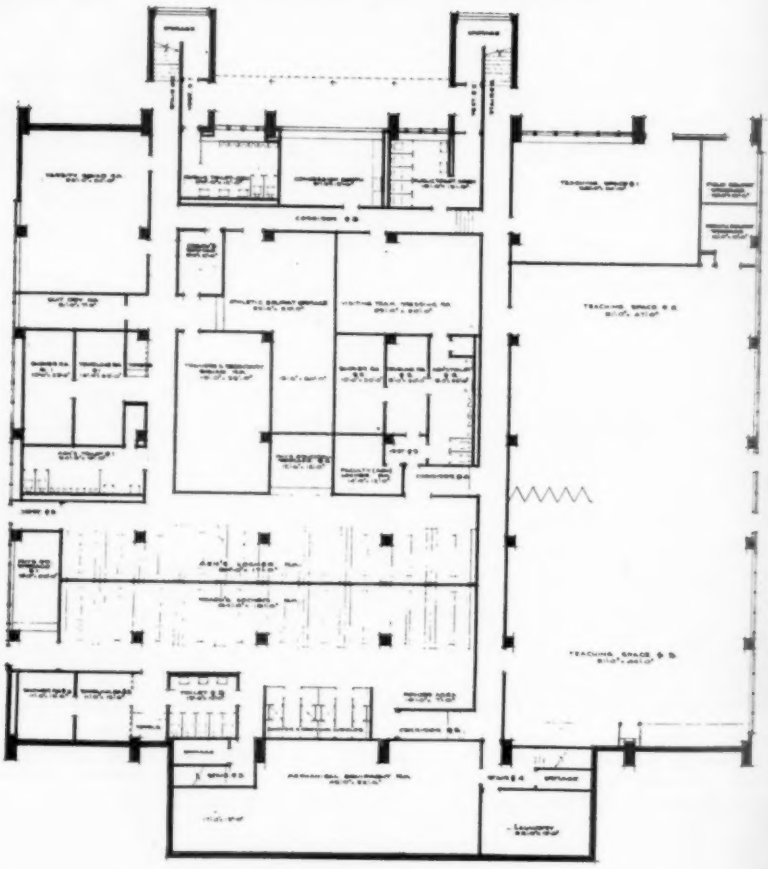
The addition to the library will provide added reading room, reference room and stack room space. A children's library room, a classroom for kindergarten children, a librarian's workroom and space for the circulation desk and catalogs will result from the remodeling of the present library. An existing classroom will be divided to form an office for the librarian and a conference room. When completed there will be shelf

Men's Dormitory planned for Montclair Teachers College. Emil A. Schmidlin is the architect. Another dormitory is also planned for the college.





Physical Education
for Montclair
signed by Emil A.



Floor plan of the Physical Education Building for Montclair State Teachers College. Areas included are men's and women's locker rooms, shower and toweling rooms, and ample storage spaces, all at the lower level.

space for about 75,000 volumes and accommodations for 150 students. The ventilating system will be such that air conditioning equipment may be installed at any future time.

Physical Education Building

This unit will be connected by a lobby to the existing building and will consist of a gymnasium 80 feet by 114 feet, an auxiliary gymnasium 40 feet by 50 feet, dressing rooms, public toilets, a lounge 30 feet by 50 feet, a student organization office, three classrooms, offices for the physical education staff and storage rooms. All these facilities will be on the main floor at ground level, except the three classrooms and a large storeroom for field equipment which will be under the gymnasium and dressing rooms at the north end of the building. Here the ground drops off sufficiently to make these provisions economical to construct.

The existing gymnasium and dressing rooms will be converted into classrooms, offices and storage space. Fortunately, the window pattern in the gymnasium is

such that it can be made into two stories with little difficulty. The folding partition which now separates the front stage from the gymnasium will be removed and a stage provided which will be about 30 feet deep. A corridor will separate the stage from the area converted to classrooms and offices. The old dressing rooms will provide long needed storage.

State College at Montclair

Located in Upper Montclair, this college occupies a 77-acre site which is as precipitous as it is picturesque. Much of the eastern border of the campus consists of a high bluff overlooking the valley to the east and the skyline of New York City. Perhaps 40 percent of the area is too rocky and steep to be used for building purposes, a fact which may add to the problem of expanding this college in the future.



Upper level of the Montclair Physical Education Building. Principal areas are the main and practice courts.

The enrollment at Montclair is expected to reach 1,235, of whom 900 will be women. While many students commute by bus and private cars, it is expected that some 300 women and 100 men will wish to live on the campus. Except for temporary houses erected for G.I. students' families there are no resident facilities for men. The two existing dormitories currently house about 200 women students.

The college has no auditorium. The existing gymnasium in the administration building with one teaching station is entirely inadequate. The food service, which is provided in one of the dormitories and in the basement of the administration building, is far short of meeting the requirements of a growing student body. Classrooms are needed for science, mathematics, English and dramatics. Some of these are now accommodated in temporary frame buildings. The industrial arts and fine arts programs which are being transferred from the college at Newark to Montclair also must be housed. The college is particularly lacking in lounges, recreation rooms, ball rooms, or other facilities designed for student life on the campus.

The construction program at Montclair is by far the largest of the six colleges, calling for $4,774,000 from the bond issue plus some $200,000 to be raised through local subscription. Out of this will come a building for combination auditorium, food service and student life facilities; a classroom building; a physical education building; two dormitories; and remodeling of the administration building to provide increased library space and several classrooms and offices.

Student Life Building

A unique aspect of the building program at Montclair has been the interest of the student body, the alumni, the faculty and citizens of the area in promoting the college as a cultural center and in providing for the recreational and social life of the student body. The sums of moneys donated or pledged by these groups are as follows:

	Goal	Pledged As of June 12
Parents of students attending the demonstration high school. Funds are to be used for a lounge, recreation room and office for college high school students and the high school PTA.	$ 25,000	$ 18,000
College students—from dues. Funds are not allocated to any particular area and will be applied to student life section of building as needed.	40,000	40,000
Alumni and patrons. Funds will be used for alumni offices, alumni reception room and addressograph room, as well as student life building as needed.	100,000	50,000*
Davella Mills Foundation—this grant is contingent upon building being started by January 1, 1954. Funds are to be used for student life building.	25,000	25,000
Faculty—staff. Funds are to be used on faculty lounge.	12,000	12,000
Total goal	$202,000	
Total pledged		$145,000

* Amount pledged by June 30, 1953

These funds will be added to the amount from the bond issue to make a total of about $1,300,000 available for the construction of what is currently designated as the student life building. Included will be an auditorium seating 1,300, a little theatre seating 240, a band and choral room, individual practice

rooms, a stage scenery shop, four classrooms, dressing rooms, a rehearsal room, a recreation room, a student lounge, a college high school students' lounge and recreation room, a conference room, offices for student body associations, offices for the alumni association, a cafeteria seating 600 students, a kitchen, a faculty dining room, a faculty lounge, three private dining rooms, a student store, a snack bar, toilet rooms, foyers, cloak rooms and storage rooms. A feature of the auditorium will be one of the finest organs in America. Originally installed in the new Waldorf-Astoria Hotel in New York at a cost of $100,000, it has been acquired by the college for a nominal sum.

This building will be located on the edge of the bluff on the east side of the campus. There will be terraces opening out from the lounges and dining rooms with a splendid view of the valley and the New York City skyline to the east.

The college has an excellent athletic field. The new physical education building will be located on the edge of this field and about 250 feet west of the administration building. The main gymnasium will be 100 feet by 114 feet with rolling bleachers on two sides seating about 1,500. A folding partition will divide this room into two teaching stations 57 feet by 84 feet. There will be two auxiliary gymnasiums, one 45 feet by 85 feet with a 24-foot ceiling and one 45 feet by 90 feet with a 12-foot ceiling. The latter can be divided by a folding partition to form two 45 feet by 45 feet rooms. Additional facilities will include a standard classroom, offices for the physical education staff, dressing rooms, concession booths, public toilet rooms and storage rooms.

The Classroom Building

A tremendous amount of planning has gone into the classroom building. Faculty members, members of the staff of the State Department of Education, The American Institute of Chemists, representatives of the U.S. Office of Education and many others have worked together to provide facilities which will aid in the preparation of teachers in different fields. To the extent that funds will permit, the plans and specifications submitted by the various groups involved are being incorporated in plans for the new building. For example: the science laboratories and auxiliary facilities follow closely the plans developed by a committee of the New Jersey Chapter of the American Institute of Chemists which worked closely with the college staff. Since New Jersey leads all states in the number of chemists and other scientists employed in industry, it is natural that considerable emphasis should be

Three new buildings for the campus at Paterson are: 1. Physical Education; 2. Addition to Food Service Building; and 3. Library.



Kunkel

placed on the educating of teachers in the science field.

Facilities for Home Economics

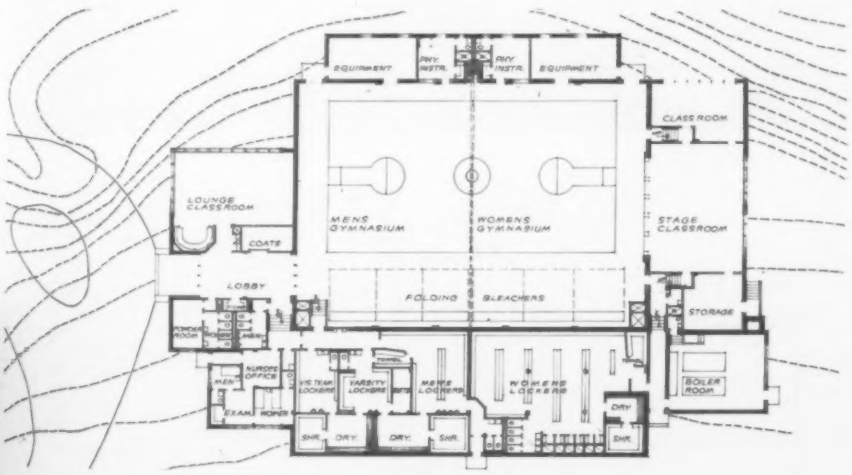
Facilities for home economics, a curriculum not offered heretofore in any state teachers college, were planned by the college staff and the supervisors of vocational home economics from the State Department of Education working with Dr. Ata Lee, program specialist, Home Economics Education Division, U.S. Office of Education. The industrial arts staff, which will be transferred from Newark to Montclair when the building is completed, has worked with State Department representatives and others for more than two years in developing plans for that department. A one-half-inch-scale model was built by members of this group to enable them to study the practicality of their plan and to eliminate any "bugs" before construction actually started. Similar research and cooperative effort provided the basic data for the fine arts department.

The classroom building will contain two laboratories for physics, two for chemistry and three for biology. There will be three laboratories for home economics, four classrooms for mathematics, four fine arts rooms and a room for geography and earth science.

There will be two dormitories, one for 100 men and the other for 100 women. Except for the home management suite to be built into the women's dormitory, these buildings will conform in general to the specifications agreed upon for all of the state teachers college dormitories.

State College at Paterson

The heavily wooded and beautifully rugged 223-acre Hobart estate at North Haledon, former home of

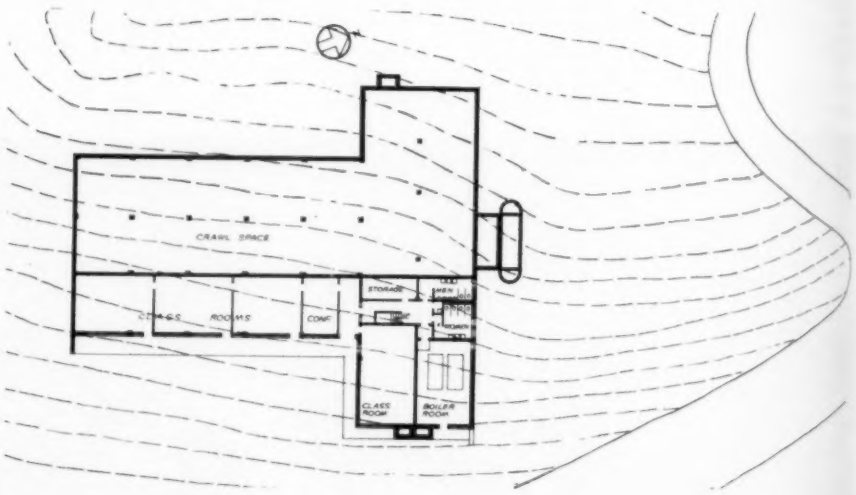


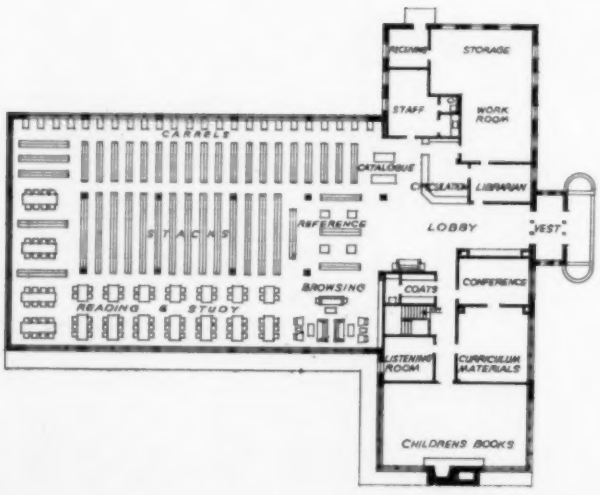
New Gymnasium for the State Teachers College at Paterson. Architects are Lawrence C. Licht and Frank E. Johnson. First floor plan, at left, shows the provisions for a physical education program as well as an auditorium, lounge and student center.





Library Building for Paterson Teachers College, Lawrence C. Licht, architect, and Frank E. Johnson, associate, is planned on a ground level (see plan at right) and an upper level (see below). All library facilities will be on the upper level.

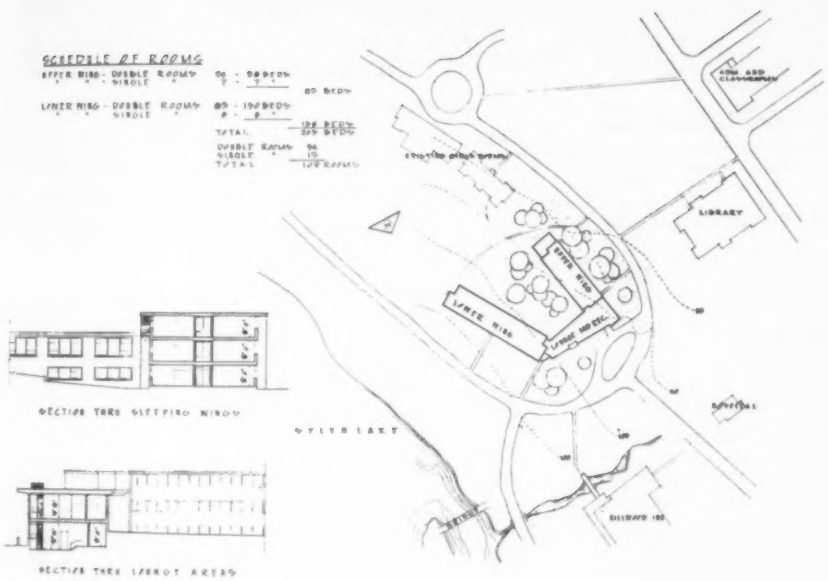




Garett A. Hobart, Vice-President of the United States, 1897–1901, was purchased by the state in 1948 as a site for the teachers college at Paterson. This college was then housed in very inadequate facilities in the city of Paterson, where it was established in 1855 as the City Normal School. On the Hobart property were the large mansion, a 17-car garage and servants' quarters building, a horse barn and several smaller buildings.

Space has been found in the mansion home, temporarily at least, for three classrooms, the library and administrative offices. The garage building has been converted to a food service facility, albeit considerably less than adequate. The horse barn was converted with some $23,000 in student funds to a student store





This Women's Dormitory will be constructed at the State Teachers College at Trenton. Van Nuys and Krahmer are the architects. Plot plan is shown at left. Located on the plot are the Administration and Classroom Building, the Library, Hospital and new Dormitory.

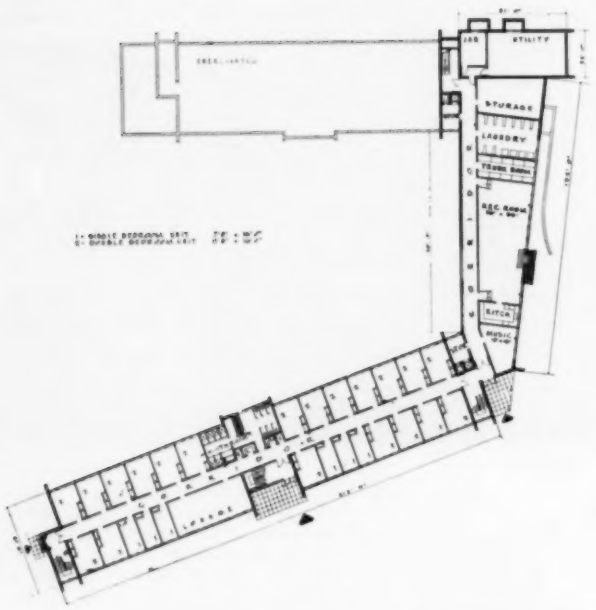
and recreation building. Hunziker Hall with 15 classrooms and a small multi-purpose room was completed in 1951.

Despite its large number of rooms and sumptuous character the mansion house cannot be economically converted to classrooms of adequate size or to rooms adapted to a good library situation. It has been decided, therefore, that the best and certainly the most economical use to which this building can be put is for staff offices. These will include offices for the president, the business office, the registrar, the deans and other faculty.

The college lacks suitable provisions for food service and a library. Other than a good field, there are no facilities for physical education. The multi-purpose room in Hunziker Hall will seat only a small part of the student body. There is no place which will serve as a center for student life and activities. At least five additional classrooms are needed. It is hoped that all of these needs will be met to a fairly satisfactory degree in the current building program which is to provide a physical education building, a library building, an addition to the food service building and some alterations in the mansion house.

With a main gymnasium 80 feet by 114 feet, a stage 32 feet by 50 feet, a lounge 30 feet by 40 feet, dressing rooms, a suite for the college nurse, and offices, the physical education building is designed to meet the requirements for the physical education program as well as to serve as an auditorium for larger group meetings on the campus. Located near the food service building, it is expected that the physical education building with its auditorium and lounge facilities will serve as a student center.

Due to the sloping character of the ground, this building will be of two stories. All of the library facilities will be on the main floor including stack space for about 75,000 volumes, reading, reference, periodicals and browsing space for about 150 students, librarian's office, work room, receiving room, a children's library



Lower floor plan of the Trenton College Women's Dormitory. Lounge, recreation and music rooms are provided.

room, audio-visual rooms and storage space. On the lower floor, which will be at ground level, there will be three classrooms, toilets and storage space.

The Food Service Building

The former garage, laundry and servants' quarters building has been used for the last three years as a food service building. It is well constructed and plans call for an addition to this building which will include a kitchen, storage rooms, office for the food service supervisor, locker rooms for employees and expansion of the dining room to permit seating 350 students and faculty at one time. In addition to the separate faculty dining room, modern-fold partitions will make it possible to provide two small dining rooms at the north end of the main dining room when so desired. A small lounge, toilet rooms and cloak space will result from utilization of existing space. The former servants' quarters will probably become resident space for college employees.

At some time in the future it is hoped that a substantial addition can be made to this building which will include a large lounge, recreation rooms, snack bar, student store and other spaces needed to make this the center for student life on the campus.

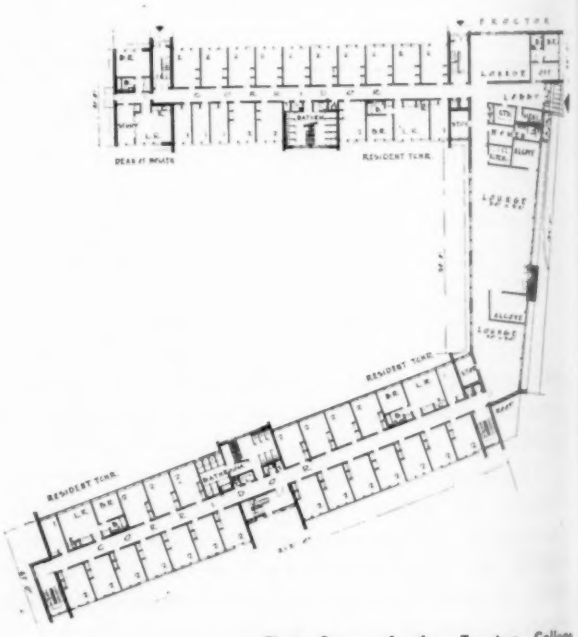
State College at Trenton

Situated just north of Trenton on a 185-acre campus bordering two small lakes, the State Teachers College at Trenton has a setting of unusual beauty. It is the oldest of the teacher education institutions in the state, dating back to 1855 when it was known as the Trenton Normal School. It has been located on the present campus since 1931. The buildings of Georgian style are excellent and consist of the administration building, the auditorium building, the library, the physical education building, four dormitories for women and one for men. In addition there are several temporary wooden structures including a women's dormitory, a rambling food service building, shops and several residences and apartment buildings for married students.

While a large number of the students commute, the character of the curriculum is such that students are attracted from distances too great for commuting. Enrollments at the college are therefore limited by a lack of sufficient dormitory facilities. The existing food service building has as its nucleus an inn which was on the property when purchased a quarter of a century ago and is most inadequate. The construction program will include a women's dormitory and a food service building.

The Women's Dormitory

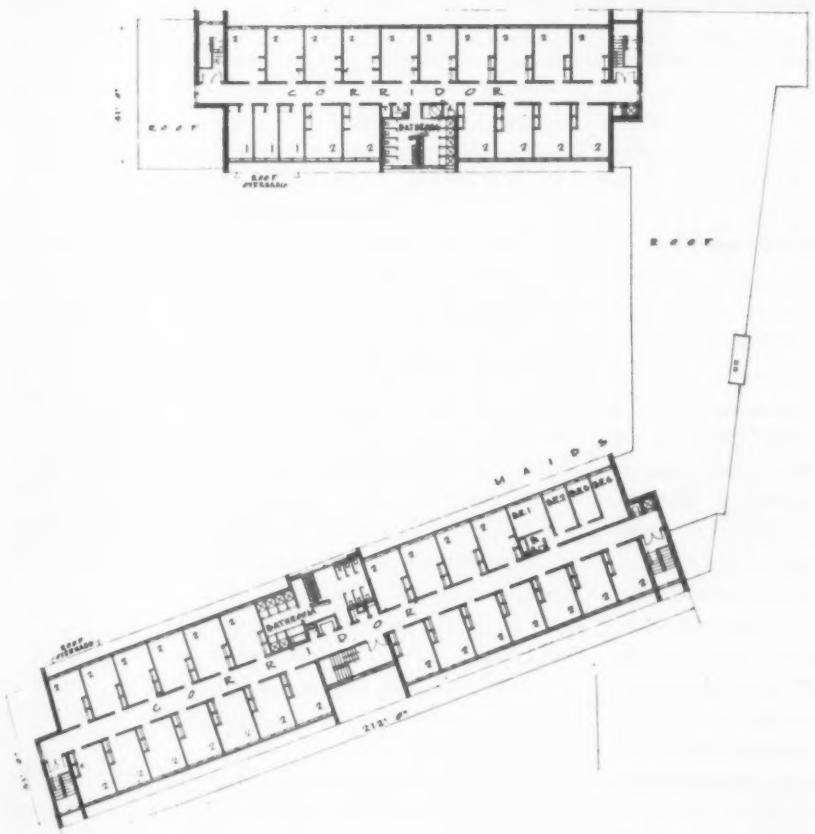
This building is designed to house 203 women students, four maids, three resident teachers, a proctor and the dean of women. It will be built at the north end of an ellipse on which are located the four existing women's dormitories. Since the ground slopes toward a lake, the east wing will be of three and the west wing of two stories. The two wings will be connected on the north by a two-story lounge and recreation room section. There will be a main lounge 30 feet by 52 feet and three smaller lounges averaging 600 square feet. Each resident teacher will be in charge of 67 girls and will have an apartment with a living room, bedroom, bath and a kitchenette. The apartment for the dean of women will have the same facilities except



First floor of the Trenton College Women's Dormitory, including the main lounge and dean's rooms.



This Administration and Classroom Building at the State Teachers College at Trenton was constructed in 1931. The building is of Georgian style.



Second floor of the Trenton Women's Dormitory. This area is devoted exclusively to bedrooms, bathrooms and maids' rooms.

that the living room will be larger and capable of having one end closed off as a study by means of modernfold partitions.

Convenient to dormitories, library and classroom buildings, the food service building will be located on a heavily wooded plot east of the physical education building. No tree will be removed which does not interfere with actual construction of the building. The main dining room seating 600, faculty dining room, three small dining rooms, lounges, recreation room, snack bar and kitchen are planned around a closed court and large terrace. All dining rooms and lounge areas will take full advantage of the beauty of the site, that is, bringing the outdoors into as close intimacy as possible with the inside. With its lounges, recreation room, snack bar and patios this building



Constructed in 1912, this Administration and Classroom Building at the Newark College will be sold when new buildings are ready for students.

will serve as a student life center on the campus. Having no columns, the large dining room will be used for student dances.

State Teachers College at Newark

This college, with an enrollment of 700, occupies a four-story building in down-town Newark which covers virtually all of the one-block site. Depending principally upon commuting students, there are no dormitories. The limited site, lack of parking space and the poor location of the college with reference to transportation facilities, makes it imperative that a new campus be found for this college if it is to expand as planned. Negotiations are in process which are hoped to result in the acquisition of approximately 120 acres convenient to main highways, bus lines and railroads so that the college may continue to draw as commuters the major portion of its student body from such heavily populated areas as Newark, Elizabeth and other nearby cities.

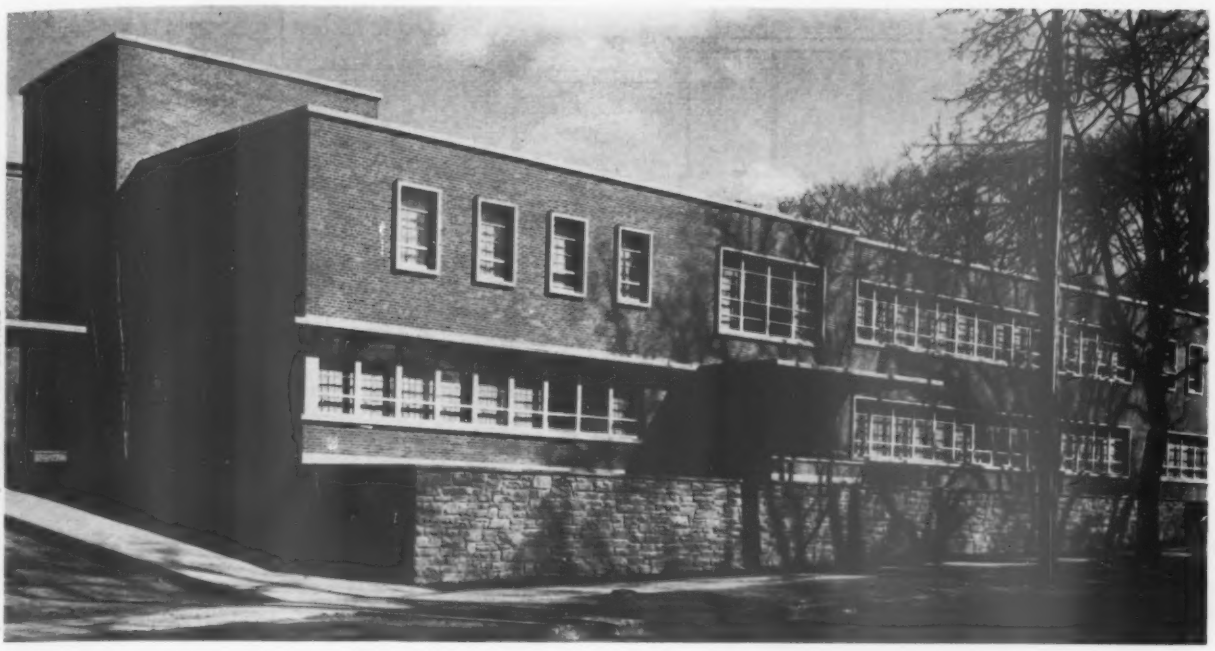
In the meantime the faculty, the president, the Commissioner of Education, the Assistant Commissioner for Higher Education, the Coordinator of the State Teachers Colleges Construction Program and others are working out details for requirements of the facilities to be constructed on the new campus. These will be turned over to the architects as soon as the land is acquired.

In addition to the $3,700,000 provided by the bond issue for the new college at Newark a considerable sum is expected to be realized from the sale of the existing building, which is in excellent condition and is adaptable to a variety of uses.

Architectural Style

The new buildings on the different campuses will be contemporary in style. This decision has been reached after due consideration of many factors. For one thing, the cost of matching existing buildings (Georgian for the most part) would be prohibitive. Most of these buildings were constructed 25 to 30 years ago when building costs were considerably less than one-half of what they are today. A feeling, too, has been growing among members of the State Board of Education, the Commissioner of Education, the college presidents and the architects that college buildings should be representative of architecture of the era in which they are built, and that in their planning advantage should be taken of every technological advance possible to insure that the buildings will be the best, considered moneywise, that man knows how to build.

Such fancy stone trim as copings, quoins, belt lines and columns, will be missing as will cupolas, dormers, porches, high pitched roofs, parapet walls and features placed on buildings primarily for decorative effects. The same kind of brick and a minimum of the stone trim used in existing buildings will be employed. The result will be that while these functionally styled, simple and clean-cut buildings will differ, they will still harmonize with and add interest to the structures now on campus.



Syracuse University Audio-Visual Service

Special Education Building at Syracuse University, Syracuse, New York. Architects of the building are Harry A. and F. Curtis King, who visited many installations throughout the country as preparation in planning facilities to meet the requirements of the program.

SYRACUSE UNIVERSITY MEETS THE CHALLENGE OF THE EXCEPTIONAL CHILD



by WILLIAM M. CRUICKSHANK

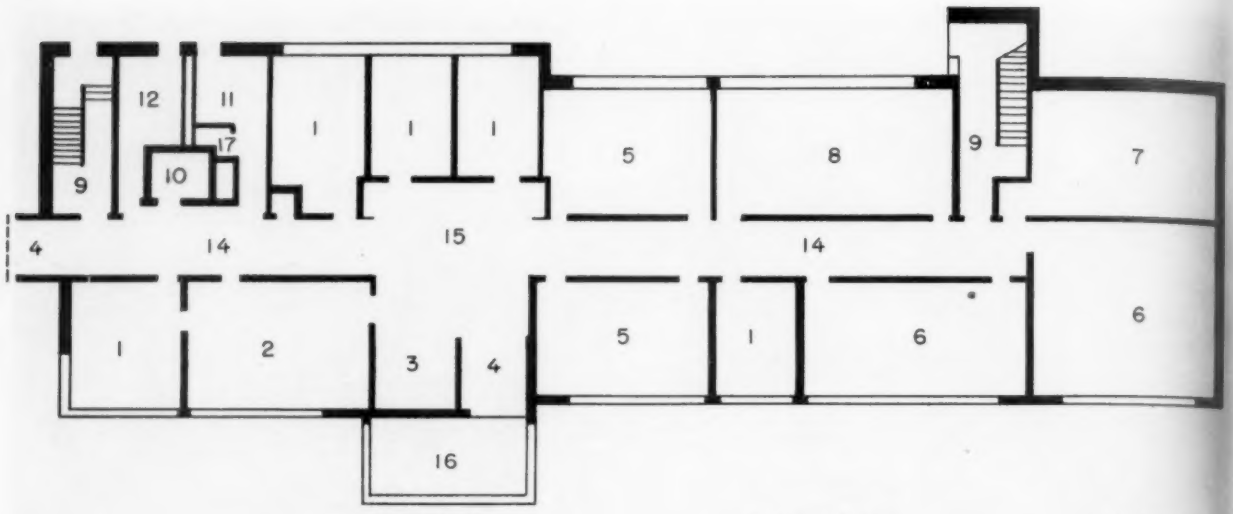
School of Education, Syracuse University

William M. Cruickshank is a professor and director of education for exceptional children at Syracuse University. He received his undergraduate preparation at Michigan State Normal College; his masters and doctoral studies were completed at the Universities of Chicago and Michigan. He is a past-president of the International Council for Exceptional Children and is a consultant in psychology and education for the New York State Association for Crippled Children.

THE education of exceptional children is not a new public responsibility in the United States. It is an area of education, however, towards which the interests of higher education have turned only recently. The focus of two world wars upon the physically disabled individual, the advances of medical and psychological sciences, and the growing awareness that the education of exceptional children is a public school responsibility has stimulated teacher preparation centers to concern themselves with this important aspect of their over-all responsibility.

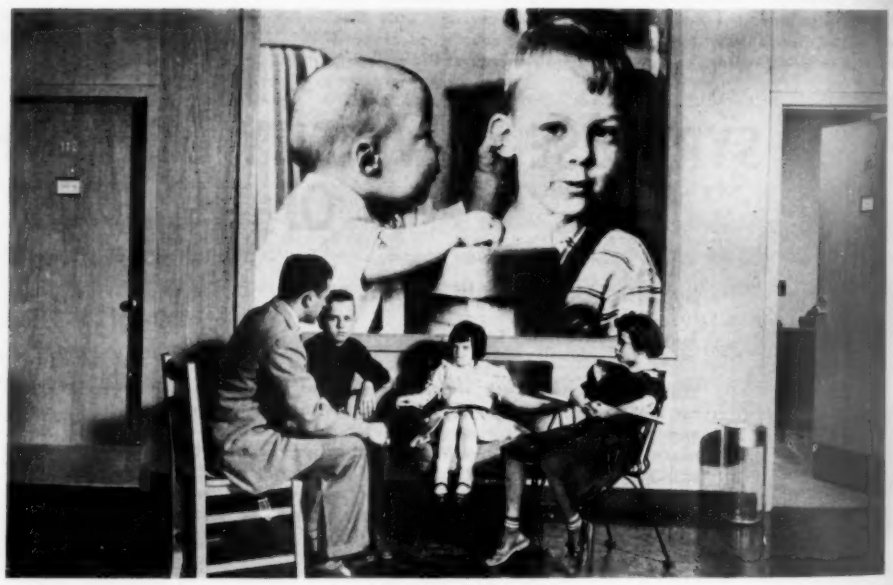
In 1946 Syracuse University, Syracuse, New York, through its All-University, School of Education undertook a broad program of undergraduate and graduate experiences for individuals preparing for teaching careers with exceptional children. Curricula in several teacher preparation areas were established. The fields of education for the mentally retarded, the intellectually superior child and the crippled child, including those with cerebral palsy, were inaugurated. Likewise strong curricula were organized for the education of children who were deaf, for those with lesser impairments of hearing and for children who had speech disorders. Summer programs have been established for the education of the child with impaired vision and for teachers interested in the educational problems of the preschool blind child.

It was immediately obvious to the administrators



First Floor Legend

1. Office
2. Secretaries
3. Waiting Room
4. Vestibule
5. Seminar
6. Classroom
7. Auditory Training Room
8. Research Area
9. Stair Hall
10. Elevator
11. Men's Toilet
12. Women's Toilet
13. Telephone
14. Corridor
15. Lobby
16. Terrace
17. Janitor



The spirit of inquiry underlying the education of exceptional children is depicted through the photo mural which greets all visitors as they enter the foyer of the building. Entrances to adjacent faculty offices can be seen.

of Syracuse University that this division of the teacher preparation program required facilities for clinical experience, for research and for university instruction which differed markedly from many other phases of the general teacher education development. It was also immediately apparent that a teacher preparation program of this type involved expenditures in terms of personnel and equipment which were not normally assumed by a typical university budget. By 1950 developments at Syracuse University in the preparation of teachers, nurses, psychologists and general classroom teachers to answer the needs of exceptional children had progressed to the point where it was necessary to think of a central location for activity and of an expansion in facilities, equipment and research opportunities.

The Syracuse University Special Education Building was dedicated on February 27, 1953, and, in many of its features, is unique in institutions of higher education. At the outset certain facilities were excluded from plans for the building. The Syracuse Public Schools, through the Board of Education, provide facilities for numerous physically and mentally retarded children. Seventeen units for mentally retarded children include many classes which are outstanding in their effectiveness and which provide excellent pre-service observation and cadet teaching experiences. The Percy Hughes School for physically handi-



First floor area for psychological research with exceptional children. Fold-away sound treated door at right divides the area into various spaces or research rooms as needed.

capped children, the Syracuse Cerebral Palsy Clinic, the Weiting-Johnson Hospital for children with rheumatic fever, the Onondaga Children's Court and its related agencies, the Syracuse State School, and other residential schools in neighboring communities provide rich resources for young teachers. The Syracuse Public Schools and other public and parochial school systems provide facilities for practice teaching and demonstration work.

A Plan Is Decided Upon

It was thus not necessary to include these facilities in the plans for a projected building. It was agreed that there would be included in the Special Education Building only those facilities which were not currently available or which could not in the future be obtained by cooperating agencies, but which would strengthen both the university's and the general community program for exceptional children and adults. Thus a plan was envisioned to provide university classroom facilities, facilities for several types of direct clinical services to handicapped persons and their families, and facilities for research in the psychological, social and educational development of exceptional children. The Special Education Building was erected through the generosity of the James Foundation of New York, Incorporated, and the Association for the Aid of Crippled Children, Incorporated, of New York City. Additional funds from alumni and friends of the Syracuse University program for exceptional children ultimately made possible a $400,000 building. The professional staff, together with the university architects Harry A. and F. Curtis King of Syracuse, visited numerous installations throughout the eastern and midwestern portions of the United States to determine the most effective ways in which to meet the requirements of the university program.

Types of Areas Housed

The Special Education Building houses services of a diverse nature. The facilities of the building make possible important research, teaching and direct clinical services. The building contains more than two dozen rooms, including offices, classrooms and laboratories; rooms in which therapy, diagnosis, testing and evaluations are carried on; seminar rooms, lounges and other facilities. Many of the rooms are so constructed that dual or triple functions can be carried on simultaneously.

The building, contemporary in design and constructed of reinforced concrete faced with *Glen-Gery* brick, is conveniently located near the University Medical Center and a projected School of Education build-



This classroom has 7-foot one-way observation windows, one of which can be seen at left. The room is decorated in a deep blue on two walls and with sutter's gold on front wall.

ing. The present structure contains approximately 2,500 square feet of floor space on each of two floors. An excavated basement under approximately a third of the north end of the building houses air conditioning, heating and electrical equipment. It also contains janitorial office and supply space, adequate space for files, an area for a large tool bench, tool cupboards, power saws, drills and other equipment needed in the construction and repair of psychological and audiological equipment used in the clinics and in research.

Convenient Location of Offices

All faculty offices, seminar rooms and classrooms are located conveniently for incoming clients and students. Students need not walk through the entire building when interviews with their professors are desired. A pleasant lobby provides an enjoyable waiting room for both clients and students. The receptionist's window is placed at an angle to permit control of almost all traffic entering the building. This is important in view of the fact that an annual case load, exclusive of college students, of more than 6,000 exceptional children, adults and their families are and will be using the facilities of the building during individual appointments and regularly scheduled clinics.

Fifteen rich colors have been used in painting the rooms. With the exception of rooms painted in greys and used on occasion by highly distracted children, two to three colors are employed in each room to give warmth and interest to the building. This has proven highly satisfactory to all who have used the facilities. Natural finished birch is used throughout for extensive prefabricated closets, bookshelves, doors and woodwork.

The north entrance of the building is reached by a sidewalk or driveway, ramp-type in nature and covered by a reinforced concrete canopy. This permits physically handicapped individuals who utilize wheelchairs or crutches to make use of the facilities of the building without experiencing the difficulties of many stairs. An elevator, placed just inside the north entrance, makes the second floor equally available and convenient to this group of clients.

The modern, well-lighted classrooms are equipped with light-proof curtains at the windows which, when lowered, make possible the use of two seven-foot, one-way vision windows. These windows permit the students to observe activities in the adjoining group auditory training room.

Group Auditory Room

The group auditory training room is equipped with air conditioning and has a sound treated ceiling. A heavy rug and rug pad cover the entire floor. Groups of from two to ten children or adults and an instructor can use this room in speech, lip reading and group auditory instruction. Microphones hidden in the ceiling with amplification in the adjacent classroom permit observing students not only to see instructional techniques, but also to hear what is taking place. The room can, of course, be used for many purposes other than auditory training with individuals who have impaired speech or hearing. It is frequently used for demonstrations of intelligence test administration and for other similar demonstration purposes.

The second floor of the Special Education Building houses a variety of facilities. The Gordon D. Hoople Hearing and Speech Center is located here. A bank of thirteen rooms at the south end of the building is used for individual speech therapy, lip reading instruction, counseling, psychological evaluation, or other individual student-teacher or student-therapist work. Four of these rooms, partially sound-treated and covered with wall-to-wall carpets, are used as modifiable audio-



Second floor plan of the Special Education Building for Syracuse University. Legend: 1. Office, 2. Rest Room, 3. Toilet Room, 4. Children's Play Room, 5. Observation Room, 6. Group Therapy, 7. Speech Therapy Room, 8. Speech Research, 9. Corridor, 10. Mod. Speech & Aud. Testing, 11. Stair Hall, 12. Audiometric Testing, 13. Medical Diagnostic, 14. Dark Room, 15. Work Room, 16. Hearing Aid Evaluation, 17. Consol, 18. Waiting, 19. Men's Toilet, 20. Women's Toilet, 21. Janitor's Closet, 22. Elevator.



A group play therapy session. Walls are ceramic tile and all play equipment is heavily constructed.



Group auditory training room. Microphone suspended from ceiling is connected with individual head pieces and with recording facilities built into instructor's desk.



A clinic room in the medical diagnostic suite. This room is equipped for simultaneous use by two physicians and is sufficiently large to accommodate small groups of students-in-training for observation purposes. The area is made pleasant with birch wainscoting and soft grey walls.

metric testing rooms. Each of the rooms contains a different type of audiometer so that students may receive a variety of experiences.

A medical diagnostic suite, including a clinic room, adjoining conference room and adjoining audiology laboratory, is located on the east side of the main corridor. All rooms in the building which are sound treated or which for various reasons have no windows are air-conditioned.

Testing and Evaluation Rooms

Two rooms, an audiometric testing room and a hearing-aid evaluation room, needed both in research and in clinic work, were carefully designed and planned by William A. Stanmyre, consultant to the Hearing and Speech Center. The goals which both architects and contractors kept in mind with respect to these two rooms were to provide a facility which was sound free from external noise and fully sound absorbent with respect to internal noise. The larger of these two rooms, 16 feet by 18 feet, is used for recording, for psychogalvanic skin reflex testing and ultimately will house electroencephalographic equipment. The smaller of the two, 11 feet 6 inches by 9 feet 9 inches, is used for hearing aid evaluations.

These two rooms rest upon steel springs with walls, ceiling and floor completely free from the remainder of the building. Air conditioning and heating ducts leading to these two rooms are hung by springs from concrete supporting beams of the main structure. An observation window connects the control room with the sound-free room. This is composed of three panes

of thermal glass set in rubber. Each pane is placed at a slightly different angle from the remaining two in order to avoid sound reflection as much as possible. Thus, the two rooms are almost completely free of contact with the building proper. Complete efficiency has been obtained. During daytime utilization of the rooms the sound level is less than 24 decibels. This is considered excellent in view of the fact that the building faces on an important street which itself has a long up-hill grade and which is utilized as a bus line and for heavy truck transportation.

Group-Play Therapy Facilities

In order to provide a suitable space for conducting individual and group-play therapy with young emotionally disturbed children, a special room was constructed. Frequently during play therapy sessions excessive amounts of water may be spilled on the floor, or highly disturbed children may smear paints and other substances on the walls purposively or accidentally. Such hard usage required serious thought in the construction of this room. To prevent water seepage through the floor only half of the reinforced concrete floor was poured originally. When this dried thoroughly a waterproof substance was spread over the entire area. Then the remainder of the concrete floor was poured. Flexachrome tile (plastic asbestos) was placed on the floor for a finished surface.

A ceramic tile wainscoting was installed, permitting easy cleaning of wall areas. Counters, benches and tables are of hard maple to resist pounding and other unusual usage. The room is equipped with sandbox, sinks with running water, extensive toys and equipment. It also is utilized for a portion of the day as a nursery center for pre-school blind children. At the north end of the play-therapy area is an observation room seating twelve persons and equipped with one-way windows, amplification and apertures for motion picture cameras.

A second play room is also included on the second floor. This room is for diagnostic and educational purposes involving pre-school children. For example, a group of four pre-school mongoloid children utilize the facility two mornings a week during a speech improvement experiment. Pre-school deaf and hard-of-hearing children make use of this same room several half-days a week. The second floor also houses a well-equipped laboratory for research, a staff lounge, a small public waiting room and ample office space for eight doctoral candidates and clinical assistants.



Photographic detail of the floor construction of the hearing aid education room. The room rests upon steel springs.

A Costly Undertaking

The education of exceptional children and teacher preparation in this important area is a costly undertaking. The total facilities of a major university are required to do the task competently. Full-time resident faculty are essential. The resources of many schools and colleges of the university are brought to bear directly upon the program. The assistance of private foundations and agencies is essential to the full development of the program and to the best type of teacher preparation program.

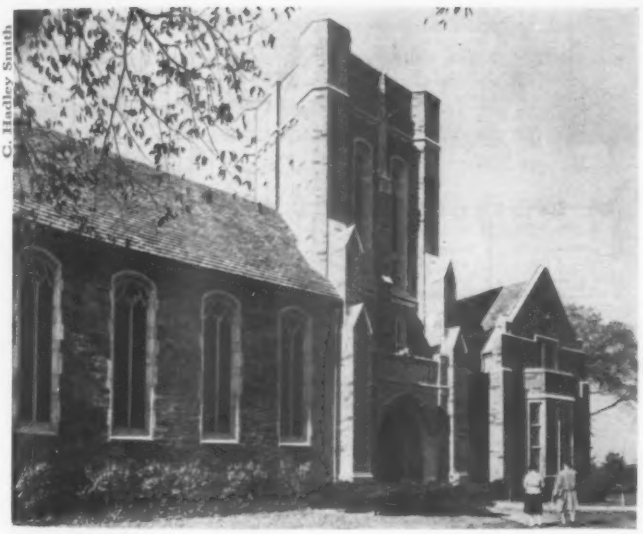
The Syracuse University program has been supported generously from time to time by such organizations as the New York State Association for Crippled Children, Inc., the Association for the Aid of Crippled Children, Inc., the National Society for the Prevention of Blindness, the American Foundation for the Blind, the National Society for Crippled Children and Adults, Inc., and from private funds of numerous individuals. The combined efforts of these many groups, together with the interest of the university itself, contribute to a program dedicated to the best in education for thousands of exceptional children throughout the United States and other countries of the world.

Albert R. Mann Library of the State Colleges of Agriculture and Home Economics, Cornelius J. White and Staff, architects.



AT CORNELL UNIVERSITY:

MANN LIBRARY AND ANABEL TAYLOR HALL



C. Hadley Smith

Main entrance, Anabel Taylor Hall, interfaith center, Eggers and Higgins, architects.

by ELEANOR BILLMYER

Department of Public Information, Cornell University

Mrs. Billmyer graduated from Heidelberg College, Tiffin, Ohio, with an A.B. degree. She has been a reporter for the *Daily Home News* in New Brunswick, New Jersey, an editor of *Federation News*, Chicago Federation of Labor and an assistant editor of the *Cornell Alumni News*.

WHEN Cornell University opened two new buildings in the fall of 1952—Anabel Taylor Hall, an interfaith center, and Albert R. Mann Library for the State Colleges of Agriculture and Home Economics—it found itself with two new quadrangles too.

Anabel Taylor Hall and its companion law school building, Myron Taylor Hall, are both roughly L-shaped and are joined to form a harmonious unit. Mann Library, with the help of two wings used for classrooms and offices, unites what used to be parallel rows of rather heterogeneous Agriculture College buildings. Now it impressively dominates the new U-shaped "ag quad."

Probably the most discussed features in each building are the revolving three-sided altar in the interfaith center and the pneumatic tube system for fast stack service in the library. But these innovations only begin to illustrate the modern equipment used throughout both buildings.

Both new buildings are distinctly student-centered. Anabel Taylor Hall is headquarters for the university's unusual student organization, Cornell United Religious Work, and Mann Library has many features that follow student suggestions from a questionnaire sent out before construction began.

ANABEL TAYLOR HALL

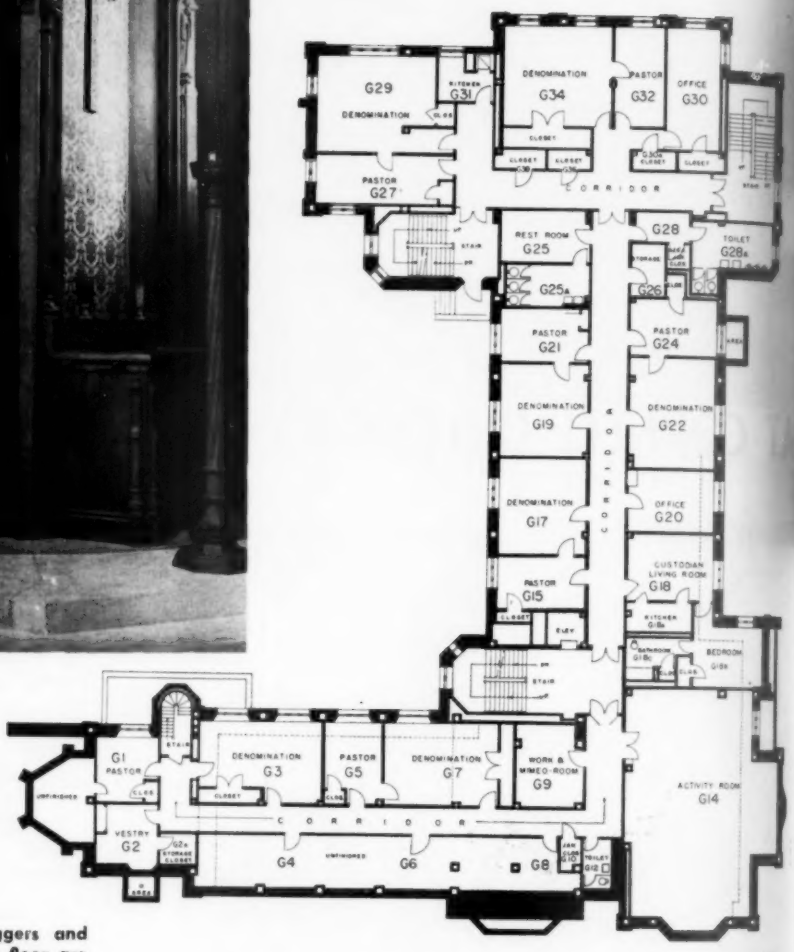
Anabel Taylor Hall, an English Gothic structure, is built of Ithaca stone with Indiana limestone trim and a slate roof. It is on a slope with three stories in front and four in the rear, and has ground level exits on the first, ground and basement floors.

Three high formal rooms at the front of the building provide a hushed religious atmosphere, al-



C. Hadley Smith

Above, Rabbi Morris Goldfarb explains the traditional carvings on the Jewish side of a revolving altar in the Anabel Taylor Hall Chapel. The Christian altar setting is to the right. A third, non-sectarian setting is not shown. Ground floor plan of the Hall is at right.



First floor plan of Anabel Taylor Hall, Eggers and Higgins, architects. The main features of this floor are the Chapel, Founder's Room, Memorial Lobby and Library.



though symbols of any particular faith are avoided. The offices, meeting rooms, library, etc., in the rest of the building are more functional and informal, with bright modern furnishings and drapes.

Directly inside the main entrance is a three-story war memorial lobby and a 25-foot limestone tablet listing the Cornell alumni who died in World War II. To the left is a three-story, 150-seat chapel with light stained glass windows, an organ in a choir loft at the rear, and oaken pews, woodwork, lectern and revolving altar, most of these hand carved.

To the right of the lobby is a two-story Founders Room where hang portraits of Myron Taylor, who gave the building, and Anabel Taylor, his wife. This room has oak paneling from floor to ceiling, flooring of three to ten-inch pegged oak boards, and museum piece furniture that the Taylors brought from Italy.

The rest of the first floor contains offices for CURW staff, student meeting rooms and a browsing library. The ground floor (one flight down) is made up chiefly of quarters for the religious groups that participate in CURW. Each university pastor has an office and a larger room for his group's activities.

Sol Goldberg



Serving counter which connects kitchen and One World Room, a large all-purpose area in Anabel Taylor Hall.



A memorial tablet of limestone, facing the main entrance of Anabel Taylor Hall, lists the 478 Cornellians who died in World War II.

In the basement is the One World Room, an all-purpose hall with large photomurals of scenes from all countries. It is connected by a serving counter with a large kitchen, which can also serve small kitchens on the floors above through a dumb waiter.

More offices and meeting rooms are on the third and fourth floors, but most of the space on these floors goes into a two-story auditorium which seats 400 persons and is used for services, lectures and plays.

An intricate public address system connects the auditorium, chapel and One World Room, so that programs in any one of these rooms may be relayed to overflow audiences in the other two.

Modern gray steel office furniture is used throughout the building, and other furniture is of blond oak or birch, with colorful upholstery of plastic or fabric in green, aqua, rose or brown.

Materials Used Within Building

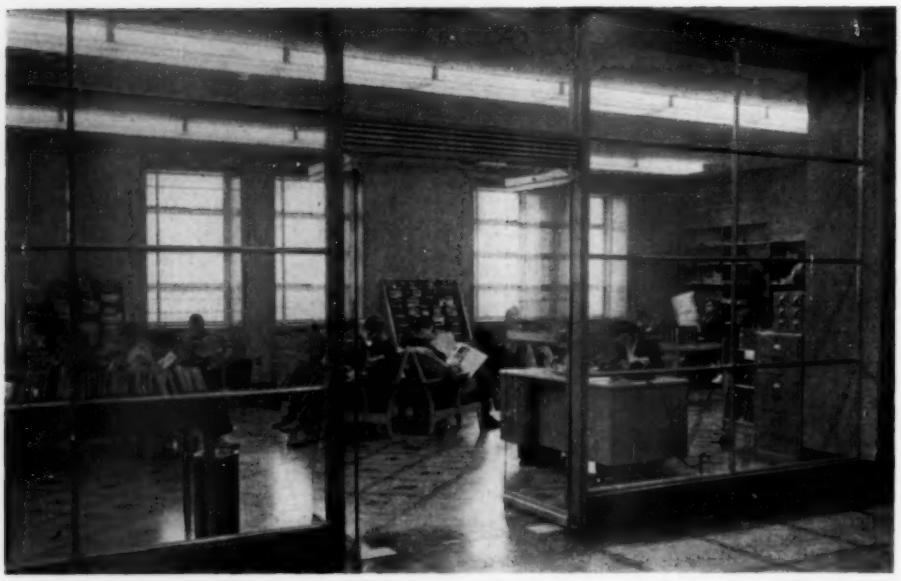
Most of the walls are plastered and painted in light tints of green, blue, rose and yellow. Corridors are lined to a height of five feet with 2 by 2 ceramic tiles, also used for rest room floors. Otherwise, except for flagstone flooring in the lobby and chapel aisles and the oak floor in the Founders Room, rubber or asphalt tile is used throughout the building. Except for stained glass windows, steel casement windows are used.

The building is heated by hot water which in turn is heated by steam from the university's central heating plant through a tunnel from Myron Taylor Hall. The lobby and chapel have radiant heating coils in the floor, the Founders Room has a panel in the ceiling. All other areas have hot water convectors.

The auditorium, chapel and One World Room have supply and exhaust ventilation and the kitchens



Air view of the unit formed by Anabel Taylor Hall to the right and Myron Taylor Hall, the Cornell Law School building. Both were given to Cornell by Myron Taylor, an alumnus of the school.



A browsing library opens from the first floor lobby of Mann Library. Large areas of glass bring a quantity of natural light into the lobby. Below is the plan of the first floor of the library.

and toilets have exhaust systems. Except for the three high rooms in the front of the building, the ceilings in every room and corridor are acoustically treated with perforated or fissured mineral tile.

The late F. Ellis Jackson, who designed Myron Taylor Hall, prepared the first sketches of Anabel Taylor Hall. After his death, Eggers and Higgins, consulting architects, took over the work. Working drawings, details and supervision were carried out by Starrett and Van Vleck and Reginald E. Marsh.

John P. Cowper Company was the general contractor, Seelye, Stevenson, Value and Knecht, structural engineers, and Cary, Jones and Miller, mechanical engineers.

MANN LIBRARY

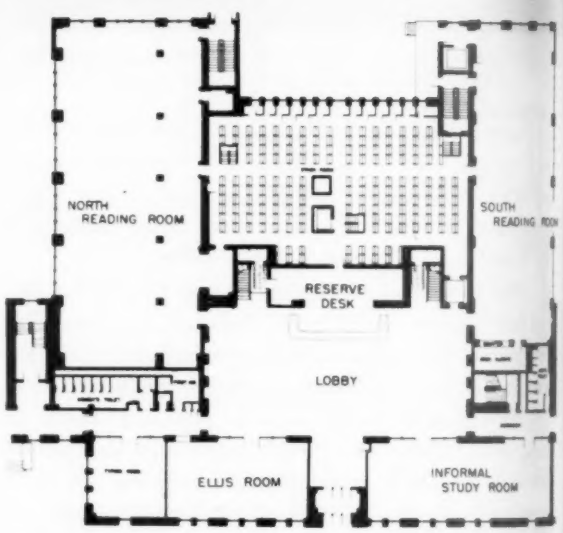
Mann Library, a gleaming modern structure of Indiana limestone facing on brick, has five stories and nine stack levels with room for 400,000 volumes.

The library itself occupies the basement and first, second and mezzanine floors. Except for the stack area, the fourth floor is taken up by two large botanical collections and their workrooms, and a smaller fifth floor by offices and classrooms.

Each main floor is built level with one of the stack floors so that book trucks can be rolled easily from one area to the other. Thus, the first floor is two stacks high (15½ feet from floor to floor) and the second is three stacks high (22½ feet from floor to floor) with a hung ceiling reducing the ceiling height to 18 feet.

Because the main floor of Mann Library has to serve as a throughway between the two adjoining buildings, most library functions are on the second floor. In the first floor lobby is the reserve book desk, which services about two-thirds of the library's customers.

No vow of silence is required in the lobby, but



acoustic plaster ceilings, rubber tile floors and a minimum use of marble keep the noise down. Heavy glass doors and large areas of glass wall let natural light and a view of the outside world into the lobby and keep lobby noise out of the study rooms.

Leading out of the four corners of the lobby are two large reading rooms, a browsing library and a study room for groups of students who want to work together. A typing room has coin-operated rental typewriters and desks for persons who own machines.

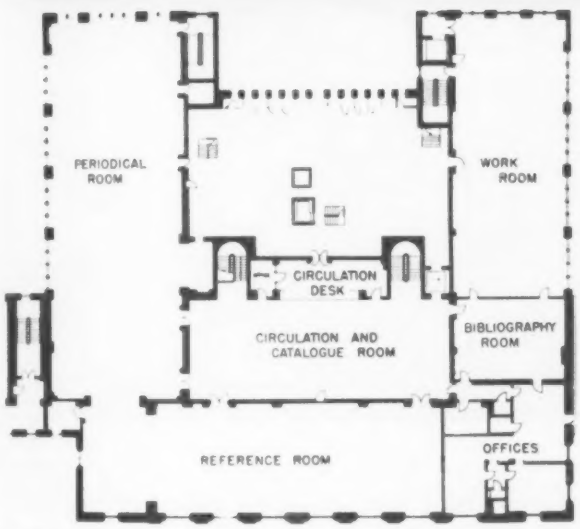
The students' plaint about having to smoke outdoors has been heeded. Smoking is allowed anywhere on the first floor except in the stacks and in one reading room.

On the second floor are the circulation and card catalog room, the reference room and the periodical room. One end of the reference room houses children's books and records for use by students in the child development classes.

The system for getting books from the closed



This reserve book desk in the first floor lobby of Mann Library serves about two-thirds of the library's patrons. At the left is a plan of the second floor of the building. Pneumatic tubes are used for communication between the desk and the closed book stacks. This system cuts down the number of student pages.



stacks to the circulation desk cuts down the number of student pages needed for prompt service. The desk clerk sends a call card by pneumatic tube to the stack level on which the desired book is located and also notifies the nearest boy by intercommunication system. He sends the book to the desk on an electrically operated book conveyor.

Mezzanine Facilities

A mezzanine along the right side of the second floor makes two levels of rooms, each about nine feet high. On the second floor proper are the librarians' offices, a bibliography room and a workroom for acquisition and cataloging operations. On the mezzanine are two offices for visiting scholars, a map room, two conference rooms and a colorful staff lounge connected with a kitchen.

Except for one eight-foot stack, each stack is seven and a half feet from floor to floor. Steel columns support both the shelving and the three-inch reinforced concrete floor above. A total of 96 carrels are provided for graduate students.

With future expansion in mind, the rear wall of the stack area has been built of brick piers in line with the shelving, with windows and metal spandrels in line with the aisles. The windows and spandrels can be removed economically, and each aisle can be extended to the rear of the building.

All woodwork and built-in shelving are of white oak with a light, natural finish. The other furniture and shelving are of birch. Card catalogs, designed

The library's electrically operated book conveyor is shown below.





Part of the reference room in Mann Library. These individual study desks were requested by many students.



Main circulation desk on the second floor. Also on this floor are the reference room, card catalogs and periodicals.

without pull-out writing shelves, encourage users to take drawers to a nearby counter and avoid crowding at the catalogs.

Students' preferences of sample chairs and tables were followed in choosing furniture for the reading rooms. Thus 40 percent of the reading room seats are at slope-top tables. Two-thirds of the chairs have arms, and can slide under apronless tables. There are individual study tables, numerous leather-upholstered easy chairs and coat cabinets in the rooms.

Some rooms have white oak veneer paneling, other wall areas being plastered and painted in shades of light green, yellow and deep rose. Ceilings are treated with acoustic plaster or fissured acoustic tiles. Asphalt tile flooring is used in offices and book stacks, ceramic tile in washrooms, marble on stairs and rubber tile elsewhere.

The reading rooms and stack areas have separate supply and exhaust ventilation systems. In the former, air comes in through unit ventilators and is drawn out through a system of ducts and exhaust fans in the opposite walls. In the stacks air comes through the two end walls and is drawn out through a central column.

The building is heated by steam convectors, supplied from the university's power plant. Steam is carried through the building by eight conduits which can be regulated separately, one for each face of the building.

Mann Library was designed by Cornelius J. White, New York State Architect, and his staff. J. W. Cowper Co. was the general contractor, Volker Brothers, electrical work, Quackenbush, heating and ventilating, A. J. Eckert, sanitary, and Otis Company, elevators.



Gottscho-Schleisner Photos

THE JULIA ROGERS LIBRARY OF GOUCHER COLLEGE



by ROBERT S. HUTCHINS

Partner, Moore and Hutchins, Architects, New York City

The firm of Moore and Hutchins was organized in 1937 by John C. B. Moore and Robert S. Hutchins. Mr. Moore received his A.B. at Harvard University and his professional training at the Ecole des Beaux Arts, Paris. Mr. Hutchins received his B.Arch. and M.Arch. degrees from the University of Pennsylvania. Both completed their apprenticeship in the office of Delano and Aldrich, New York. School architecture by the firm includes private and public schools and college buildings. Both Mr. Moore and Mr. Hutchins have taught—Mr. Moore at Columbia University's School of Architecture and Mr. Hutchins at Cooper Union.

A SIGNIFICANT milestone in the history of Goucher College was reached in September of 1952 when the new Julia Rogers Library was opened for the use of the students and faculty. The completion of this building was the culmination of fourteen years of planning and building by the college to achieve its relocation on a new country campus. The 421-acre site had been acquired as early as 1921. It was not until the late 1930's that the president and the board of trustees were able to take the first definite step of the long proposed move.

With the assistance of the Baltimore Chapter of the American Institute of Architects, a nationwide competition was held in 1938 to select an architect to prepare a general plan for the new campus and to design one principal building. The winners of the competition were Moore and Hutchins of New York who, during the years that followed, were successively retained by the college as architects for the new buildings and for the campus development.

The general plan submitted in the competition was promptly adopted without change by the trustees. With minor adjustments to the changing needs of the college, it has been remarkably closely followed in the subsequent development of the campus. The library has always occupied a central position, both in the educational program of the college and in the plan for its physical facilities. When it opened, the new campus became an established fact. With the completion in 1953 of the Science Building and with the Physical Education Building now under construction, the last major phase of the building program has been





Student carrels, at left, and reading area, above, of the new Julia Rogers Library of Goucher College.



This is the lobby of the Goucher College Library. Just beyond is the reading area. Moore and Hutchins, New York City, are the architects of the building.

brought to a successful and long awaited conclusion.

The library was quite naturally the building included in the original competition program for detailed study. Many of the basic conceptions of Moore and Hutchins' first scheme are discernible in the final plan, but many features required adjustments more than once in the interest of economy and in the light of closer study of the needs of the college.

Establishing the Requirements

In order to evaluate the arrangement of the Julia Rogers Library it is necessary to consider the method by which the requirements were established. As early as six years previous to its completion, a Faculty Planning Committee had developed a revised written statement of the needs, not in terms of space requirements but in terms of activities. Emphasis was placed on general principles, including the desirability of close physical relationship of students and books, and the particular implications of library use in a relatively small liberal arts college for women. The basic functions were stated briefly as follows:

1. To serve a student body of 1,000 young women, one third of whom may be living off campus.
2. To serve the faculty in their teaching and research.
3. To provide adequate facilities for the staff.
4. To house a collection of nearly 100,000 books immediately and provide for expansion to care for double that number.

For the benefit of the reader it was suggested that there should be "relatively small rather than monumental reading rooms"; that ample provision for quiet study and reading be provided, together with close access to the various divisional teaching areas of the college, that flexibility for expansion and rearrangement within the building be assured and that provision be made for good service access by road. The importance of sound control and adequate lighting was stressed. All traffic in and out of the library (except at the service entrance) was required to be under visual control of the circulation desk.

Prior to the development of preliminary drawings, a number of library authorities were consulted as well as the architects, and valuable advice received in the formulation of the program. The result was a carefully considered set of principles and specific needs on which agreement was fully reached. These were carefully reviewed by the president and trustees of the college, modified somewhat in the interests of economy and turned over to the architects as a basis for preliminary design. Many subsequent conferences with faculty and college officials resulted in the building as here pictured.

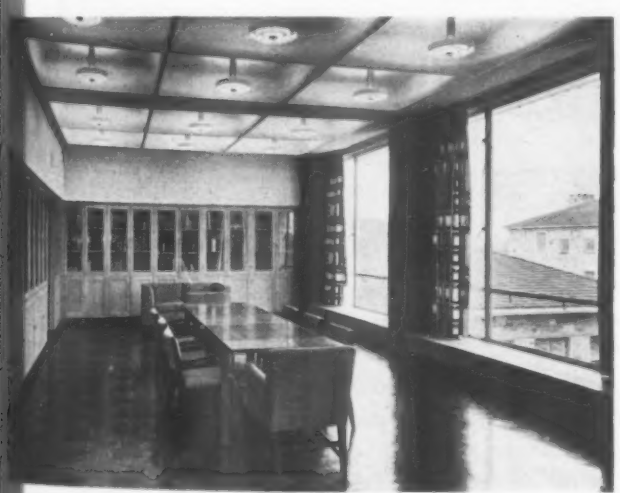
The long process of planning for the library was

begun when Eleanor W. Falley was librarian, was continued and brought to completion under her successor, Elizabeth Miller Shaw. Final details before the building's opening in October, 1952, were the responsibility of the present librarian, Sarah Davlin Jones.

In the general plan of the campus the library dominates the academic group. It is closely related to Van Meter Hall, classroom building for humanities which flanks it on the east, and to Hoffberger Science Building on the west. The library is on three levels—the main or first floor level is entered directly from the academic area of the campus. It accommodates the lobby, with circulation desk and card catalog, one of the principal reading areas, the reference room, the periodical room, the librarian's office and the cataloguing area.

Because of the slope of the site, a lower level ground floor is provided with full natural daylight at the rear. This level houses various conference rooms, the students' lounge, audio-visual facilities, a book store, service and staff and delivery areas, boiler room and a reading space for seldom used books.

On the second floor are additional reading areas, spaces for archives, conferences and typing and a rare book room which occupies a dominant position overlooking the campus. Outdoor reading is provided for on a terrace reached from the easterly stairway.



The rare book room is located on the second floor. It is also available as a conference room.

Modular Structure

The structure is modular throughout. It is planned on a 13-foot-6-inch column spacing which permits full flexibility in the arrangement and rearrangement of book shelving and reading spaces. In reading areas 1 and 2 the book shelving is in cores with general reading areas on one side and window-lighted carrels on the other. Groupings of lounge furniture and low, free-standing book shelving create an informal environment and subdivide the reading area. Greater book capacity can be secured by adding more cases and reducing slightly the number of reader spaces.

The outlook from the library in all directions over the campus and distant rolling hills is exceptionally attractive; every effort has been made to make the most of it through reduction of solid partitions to a

Construction Outline

Foundation Walls	Reinforced concrete
Superstructure	Skeleton steel frame
Exterior Walls	Fieldstone with limestone and wood trim
Floor Slabs	Reinforced concrete
Interior Walls	Plaster on concrete block furring and partitions
Floor Finishes	Rubber tile in all principal areas—asphalt and ceramic tile elsewhere
Ceiling Finishes	Acoustical tile
Lighting	Semi-indirect fluorescent in all major areas
Heating and Ventilation	Zone controlled convectors, oil burning steam boilers, independent central system supplies ventilation and humidification
Construction Cost	$600,000.00
Structural Engineer	Theodore Barbato
Mechanical Engineer	Joseph P. Wohlpart Associates
Interior Design Consultant	Ann Hatfield Associates
Landscape Architect	Morris E. Trotter, Jr.
General Contractor	Harry A. Hudgins Company



All areas on the main level are under the general control of the main desk. Lighting is semi-indirect fluorescent.

Gottscho-Schleisner Photos



First floor plan of the Goucher College Library. Included here are the librarian's office, periodical room, reference room, reading area, carrels and the main lobby of the building.



Second floor plan of the library. Two reading areas are located here, with additional carrels.

minimum. Wood and glass separations are used for quiet and privacy. The interiors are keyed to an overall color scheme which includes light gray floors and several shades of beige walls and shelving. Limited areas of bright color in blue, terra cotta and soft green have been used as foils on individual walls, in the furniture, the fabrics and in accents of the floor patterns.

The new library building accommodates 375 readers and has shelving for 130,000 books. It is planned for expansion to 600 readers and 200,000 volumes.

Area Relationship

Careful attention has been given to planning the library work areas in their relation to each other and to the various reading and book shelving areas. Direct access is provided from the cataloguing room to the card catalog, which in turn is immediately accessible to the main desk. The reference librarian has both a private work office and a consulting desk in the lobby adjacent to the reference room.

All areas on the main level are under general control of the main desk. Traffic up and down the main stairway is also supervised. A self-operated passenger elevator provides service to all three floors for book trucks.

The standard library furniture and the carrel desks were furnished by Remington Rand. The sheet steel standard book shelving was provided by Snead & Company. The lounge furniture and fabrics are from various sources.



Northeastern University Press Bureau

View of the recently completed Library Building at Northeastern University, Boston, Massachusetts. At right is the Student Center. Architects are Coolidge, Shepley, Bulfinch and Abbott.

LIBRARY BUILDING—NORTHEASTERN UNIVERSITY



by GEORGE A. SPEERS

Manager, Press Bureau, Northeastern University, Boston

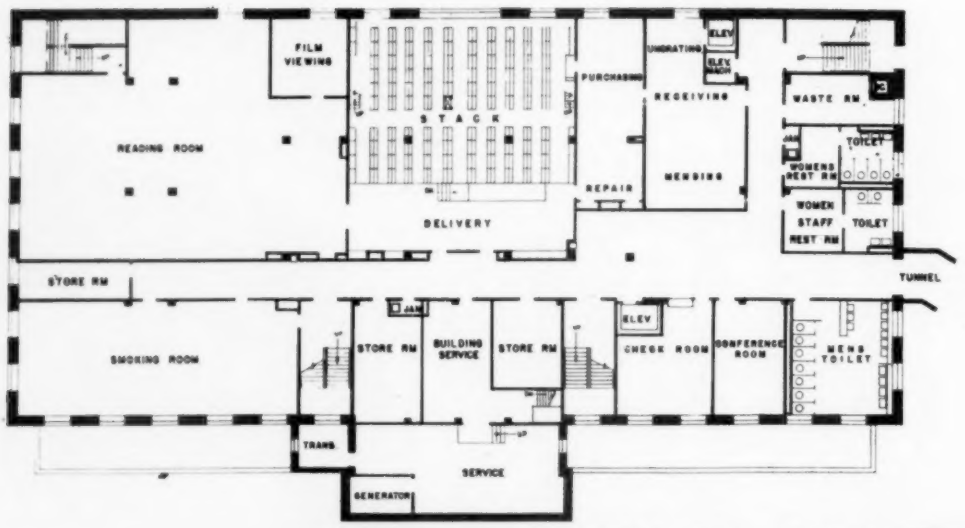
George A. Speers graduated from Northeastern University in 1947 with a B.A. degree. A U.S. Army veteran of World War II he served in North Africa and the China-Burma-India theatre of operations. At Northeastern University Mr. Speers has held the positions of assistant director of alumni relations and director of the publication division of the Press Bureau which he now manages. He is presently attending Boston University, studying advanced journalism.

ON October 9, 1953, Northeastern University in Boston noted the first anniversary of the dedication of its new $1,500,000 Library Building. Long before the building existed, however, university officials had decided that two guiding principles should be followed during the actual construction. They were *flexible* construction and *functional* design. It was around these two concepts that the architects, Coolidge, Shepley, Bulfinch and Abbott, developed the plans which eventually spelled out a modern library for an urban university.

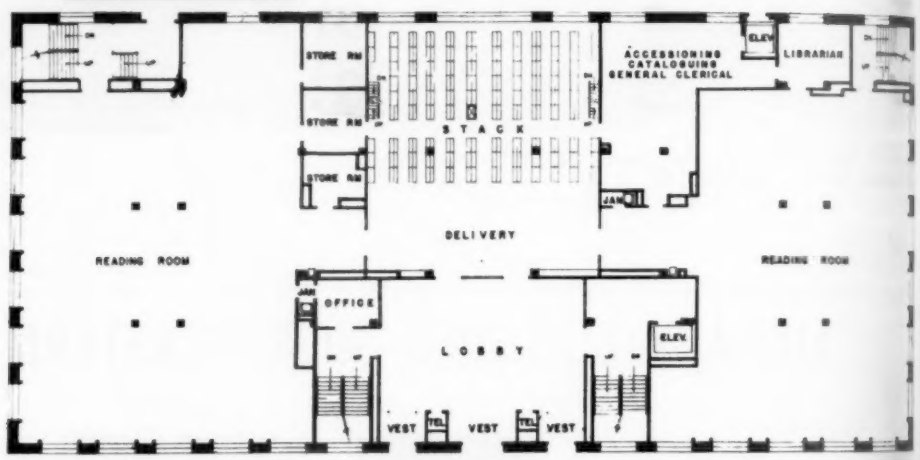
The Decision Is Made

The need for library space at Northeastern was acute. It was fully recognized during the planning stages that the university's current library requirements could be met by using less than half the amount of space provided by a new building. It was further estimated that this space would meet library requirements for several years in the future. President Carl S. Ell, the then vice-president, Everett A. Churchill, and other members of the administration were thinking in terms of the future. Eventually, they felt, library facilities would expand to the point of requiring an entire building.

In the meantime, it was decided, the upper two and a half floors of the proposed four-storied structure could be used to advantage as classrooms and engineering drawing rooms. Both of these uses would require no heavy equipment or costly installations. Also,



Basement floor plan of the building. The reading room seats about 135 students.



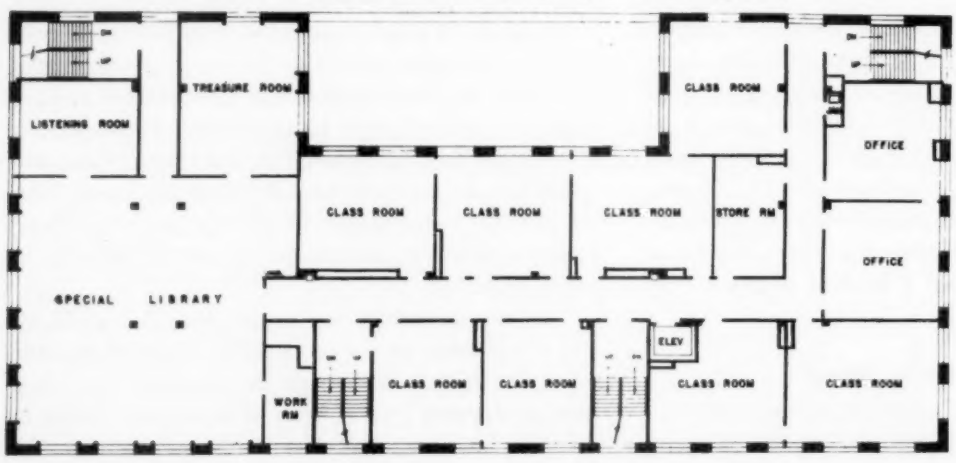
First floor plan. Here are located the two main reading rooms, and the central desk.

partitions between the rooms would be constructed of thin cinder blocks to be removed as the Library expanded. Thus, sometime in the future as library space is needed, the classrooms and drawing rooms could be shifted to other areas with a minimum of expense and alterations.

The concept of flexibility was carried one step further in designing the main stack, located between the wings of the U-shaped building. At present the stack, which has four tiers, rises only to the second floor and accommodates 160,000 volumes. Eventually the stack will be expanded vertically to reach the top of the building and will be large enough to house 350,000 volumes.

Maximum Efficiency of Use

The other concept which played a dominant role in the planning of the Library Building, functional design, is not new at Northeastern. It dates back more than twenty years when the pattern was established for all buildings on the main campus. The design is termed contemporary classical. Perhaps a more precise de-



One wing of the second floor is for library purposes. About 90 students can use the reading room at one time.

scription might be utilitarian and functional. No extra expense is added by architectural frills, Gothic towers or the like. The building follows horizontal and vertical lines throughout. Practically every square foot of space can be used to its maximum efficiency and the design keeps the maintenance and repair costs down to a minimum.

Details of Construction

A brief examination of some of the major characteristics of the building reveals that it contains some 85,000 square feet of floor space and is a steel-framed, reinforced-concrete structure supported by spread footings. The exterior is of white hytex brick. Windows are steel frame and extend from the first floor to the top floor, separated at floor levels by metal spandrels painted with black gloss and covered with colorless plate glass. The five floors are served by fully enclosed metal stairways with safety treads.

There are two elevators which accommodate passengers and freight: one is a hydraulic freight elevator operating between the ground and first floors for the library work areas, with an opening to the outside loading platform; the other is a standard passenger and freight elevator running from the basement level to the top floor. Two other smaller ones, suitable for transporting books and small supplies, are located in the cataloguing room and the main stacks. One is manually operated and the other is power-driven.

Reading Room Facilities

With respect to reading rooms currently 650 students can be seated at one time but eventually 1,500 will be accommodated at one sitting. The two main reading rooms and the central desk are situated on the first floor. The reading rooms occupy the wings of the U-shaped building while the central desk is located in the connecting lobby. Each room is approximately 75 feet long by 65 feet wide; one seats over 200 students while the other seats 165.

The basement contains library work rooms for cataloguing, etc., a reading room which seats approximately 135 students and a smaller reading room, seating about 65 students, in which smoking is permitted. Another room, approximately 20 feet by 15 feet, has been set aside in the basement to be used as a microfilm room as soon as the equipment is available.

On the second floor one wing is devoted to library purposes. Three-fourths of the wing contains another reading room furnished with Windsor, school brown study tables and chairs in the center area with side alcoves equipped with green plastic fabric covered lounge chairs. Approximately 90 students can be



Students enjoy modern methods of study in the listening room of the Library. The room is completely soundproof with acoustical tile on upper portions of walls as well as on the ceiling.



The Erwin H. Webster Room has birch paneling topped by blue painted walls. Walls behind the mauve metal shelves are painted aqua. This room is located on the first floor.



Northeastern University students settle down for some book browsing in the special library of the new Library Building. This room is located on the second floor, and is wired with a sound system.

accommodated in this area at one time, and the room is wired with a sound system. The remainder of the wing contains the listening room and the Treasure Room. The listening room has three tables equipped with turntables for records and the tables have a total of twenty-five outlets for earphones. Here students listen to recordings of symphonies, operas, poetry, works of drama, etc., with the privacy offered by the earphones. The Treasure Room is planned to contain items and information of historic interest to the university. In the meantime the room is used for seminar and similar purposes and seats 36 students.

Flooring in all reading and study rooms in the library is cork to absorb as much sound as possible. Surface in the corridors is inlaid asphalt tile, while the outer lobby has a polished white marble covering. Acoustical tile of mineral fiber is used for all ceilings. Heating is furnished by steam purchased from the Boston Edison Electric Company.

Interior decoration in three of the four main study rooms consists of clear oak paneling, seven feet high, with pastel blue walls from this point to the ceiling. The metal book shelves lining the walls in each of these areas are chocolate brown, while the walls behind the shelves offer a pleasant contrast in maroon-brown. The fourth reading room, on the south side of the first floor, has birch paneling on the lower part of the walls with pale blue painted walls extending to the ceilings. In this large study room, named the Erwin H. Webster Room, the metal book shelves are mauve while the walls are aqua.

In conclusion, one more aspect of the Library Building perhaps might be noted. A tunnel extends from the basement of the building, runs underground and connects with similar passageways extending from other buildings. This arrangement makes it possible to walk to any of the major buildings on the campus without stepping outside. What a boon to Northeastern students during some of the cold and stormy days often found in New England!

COWAN HALL—AUDITORIUM AND CHAPEL FOR OTTERBEIN COLLEGE



by EUGENE T. BENHAM

Benham, Richards and Armstrong, Architects, Columbus, Ohio

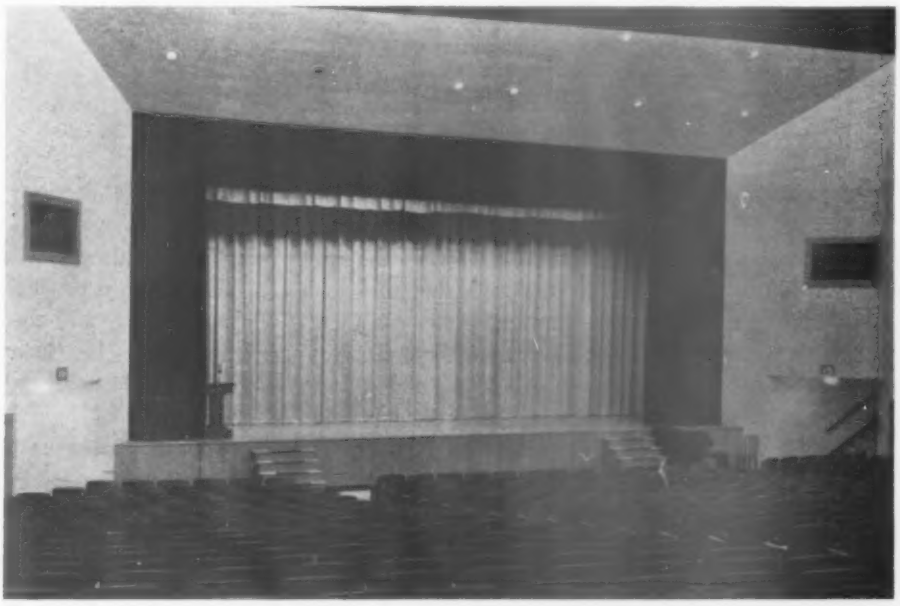
Eugene Benham is senior member of the firm of Benham, Richards and Armstrong, Columbus, Ohio. This firm was established in 1919. Mr. Benham holds an engineering degree from Ohio State University and an architectural design degree from Carnegie Institute of Technology. His firm has designed many schools, college and industrial buildings in the past 34 years. Their Farm Bureau Insurance Building was given an "Office of the Year" award in 1951.

THE simplest way to finance and build a college building is the way it was done at Otterbein College, Westerville, Ohio. This consisted of finding a millionaire alumnus who had always felt grateful to his alma mater and the teachings of its professors for his success in life. Such a man was Clyde E. Cowan of Greensburg, Pennsylvania, who presented the college with a check for $400,000.

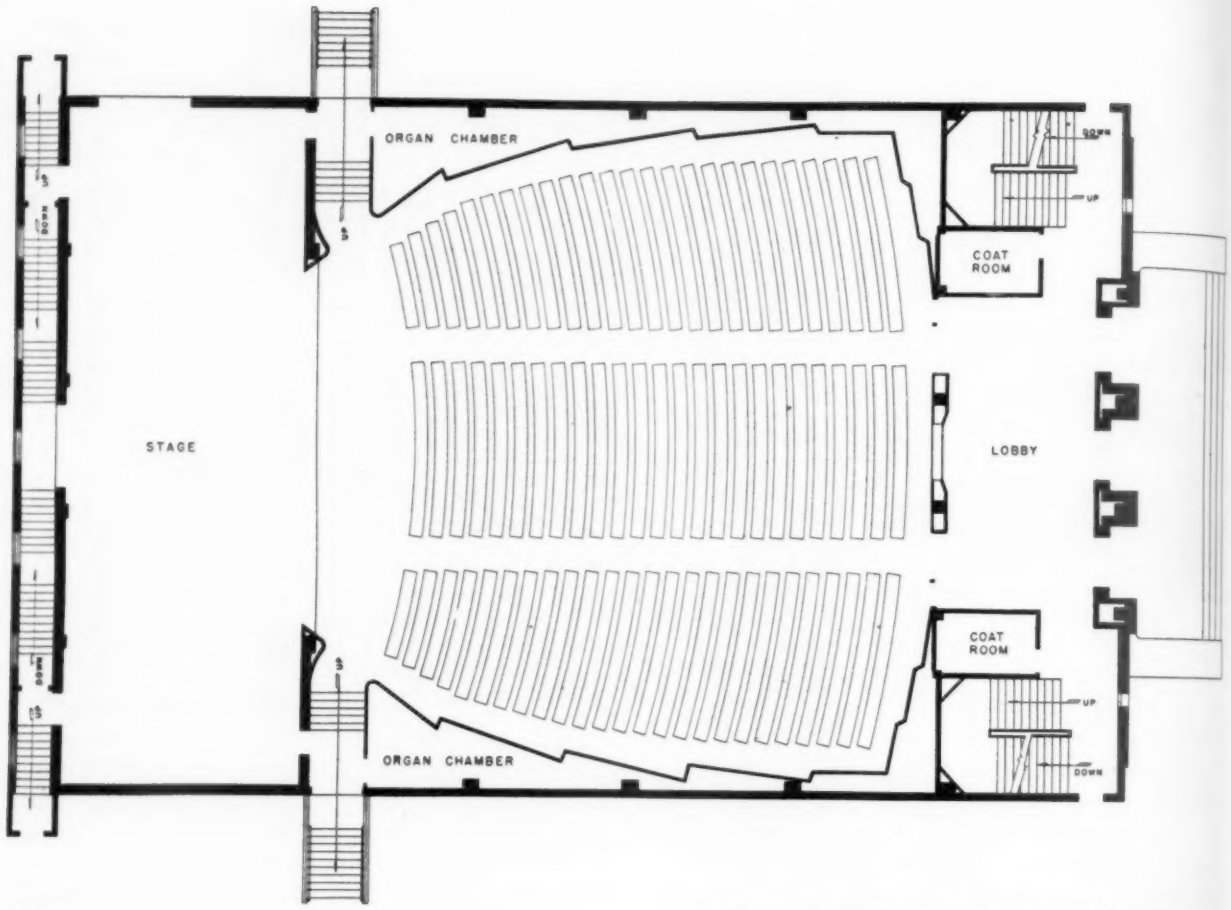
The idea started with Dr. Wade Miller, alumni secretary, who stated that Mr. Cowan was interested in fixing up the old chapel built in 1892. A meeting was held with a committee from the faculty of the music and drama departments, Dr. J. Gordon Howard, president of the college, Mr. Saunders Frye, business manager, Dr. Miller and Eugene Benham, member of the firm of Benham, Richards and Armstrong, architects for the college.

It very quickly developed that the requirements of the college precluded the use of the present chapel, as both the music and drama departments required an auditorium capable of seating at least 1,200 and would further require a sloping floor with ample stage and lighting facilities and provisions for the later installation of a pipe organ. Then, too, the old chapel would have to be rebuilt as it was not fireproof and constituted a violation of the State Building Code.

The architect advised that it would be less expensive and much more practical to construct a new



The auditorium of Cowan Hall seats 1,300 persons, with 450 in the balcony and loges. The stage area is 32 feet deep and 85 feet wide. Footlights have given way to a light trap in the ceiling.



Auditorium and balcony plans of Cowan Hall. The lobby and concourses off the balcony and ground floor provide access to other parts of the building. Beneath the stage is the drama workshop. Flats and other stage equipment are stored here and hoisted through large doors to the stage level when needed.

building which could be planned to provide the necessary facilities. He offered to prepare a sketch of such a building to submit to Mr. Cowan for his consideration. This was done and Mr. Cowan on the spot wrote his check for the amount stated. All of the above, from the first meeting to the receipt of the check, occupied less than a week.

Planning the Building

In planning the building, the architects and various faculty committees spent several months in visiting similar buildings which had been erected by other colleges. This produced very beneficial results, as it usually does, and developed ideas both of desirable features to be incorporated and mistakes to be avoided. Most of the mistakes involved inadequate stage size and lighting. The committee decided that the stage should be of such a size and so equipped that productions of any size could be produced. The stage is 32 feet deep, 85 feet long and 45 feet high and is equipped with the very latest type of fly gallery, with counterweighted sets, projection screen, as-

bestos curtain, stage switchboard, dimmer banks, organ console and other equipment.

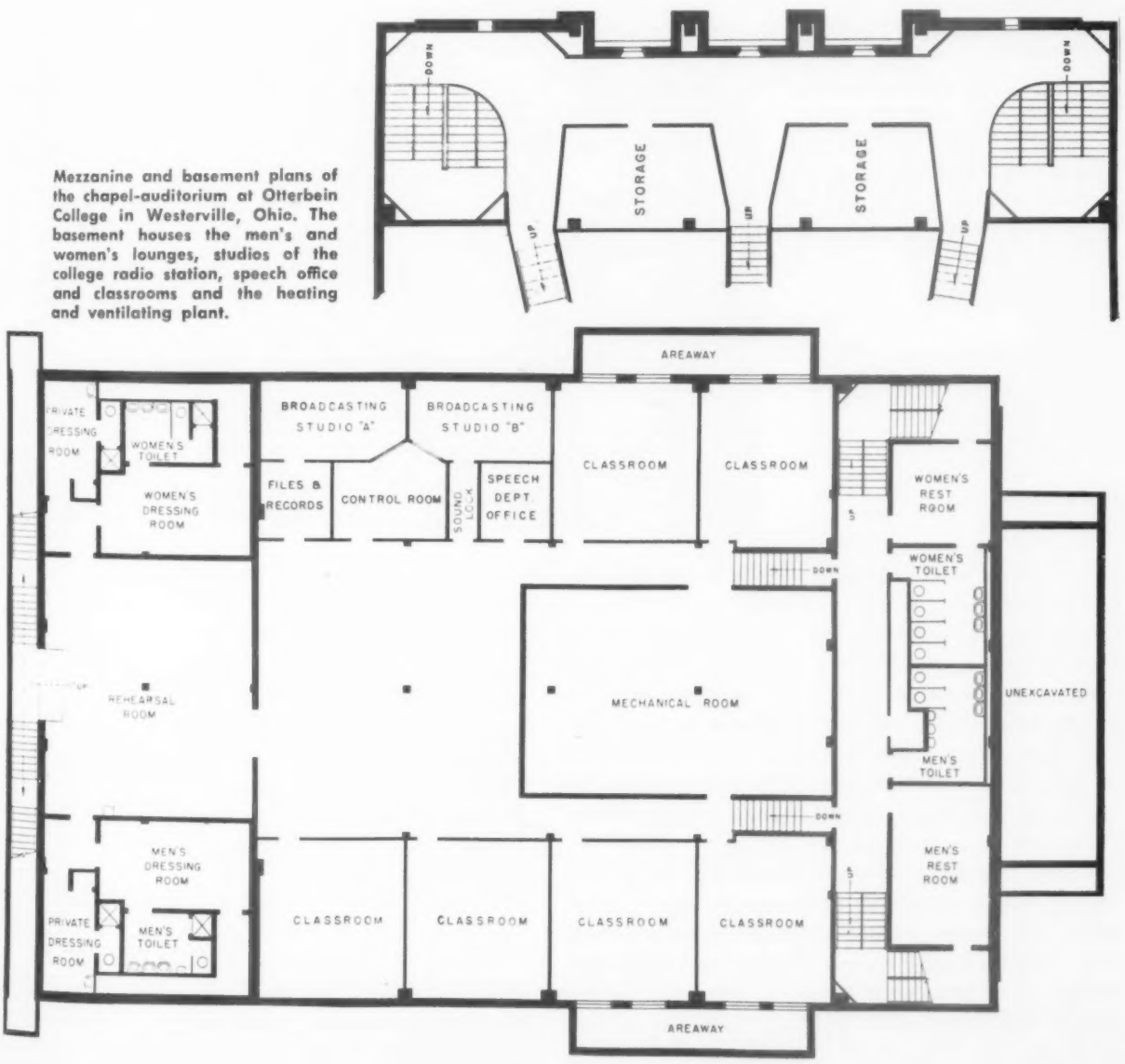
The height of 45 feet enables complete sets to be "flown." Stage equipment consists of a switchboard with a versatile cross-connect panel enabling any circuit to be connected to any dimmer in the board. Basic lighting has been provided with four sets of border lights, each equipped with separate circuits for the three primary colors supplied. Footlights have given way to a light trap in the ceiling. Front lighting can also be supplied from the balcony rail or the projection booth. A projection booth has been provided for visual education.

Altar and Stage Facilities

An altar built on rollers has been provided with suitable backdrop all enclosed in a cyclorama which gives a very religious atmosphere when the building is used as a chapel for the college. One unique feature in connection with the stage is the arrangement to allow stage scenery, such as flats and other equipment, to be built in the rehearsal room below the stage by students. It is then brought up through a large opening at the rear of the stage which is protected at other times by a steel rolling shutter. The rehearsal room is also the drama workshop.

Dressing rooms below the stage are provided for both men and women with dressing tables and adequate lighting for makeup both for chorus and star dressing rooms. A call bell and a paging system are provided. A spotlight gallery is built into the ceiling of the auditorium and is controlled from the stage or projection booth. Catwalks were installed above the auditorium ceiling to permit easy changing of light bulbs.

A telephone system is used between the stage and projection booth to supervise the production of any program even the most elaborate musical shows, if desired. The organ from the old chapel has been



Mezzanine and basement plans of the chapel-auditorium at Otterbein College in Westerville, Ohio. The basement houses the men's and women's lounges, studios of the college radio station, speech office and classrooms and the heating and ventilating plant.



Cowan Hall is of brick construction with interior walls and ceiling of the auditorium splayed in form. The building successfully serves the needs of community assembly, college chapel and college and community theatre.



moved to the new building and rebuilt, but is to be replaced later by a four-manual pipe organ. The space for such an organ was provided after consultation with several organ manufacturers.

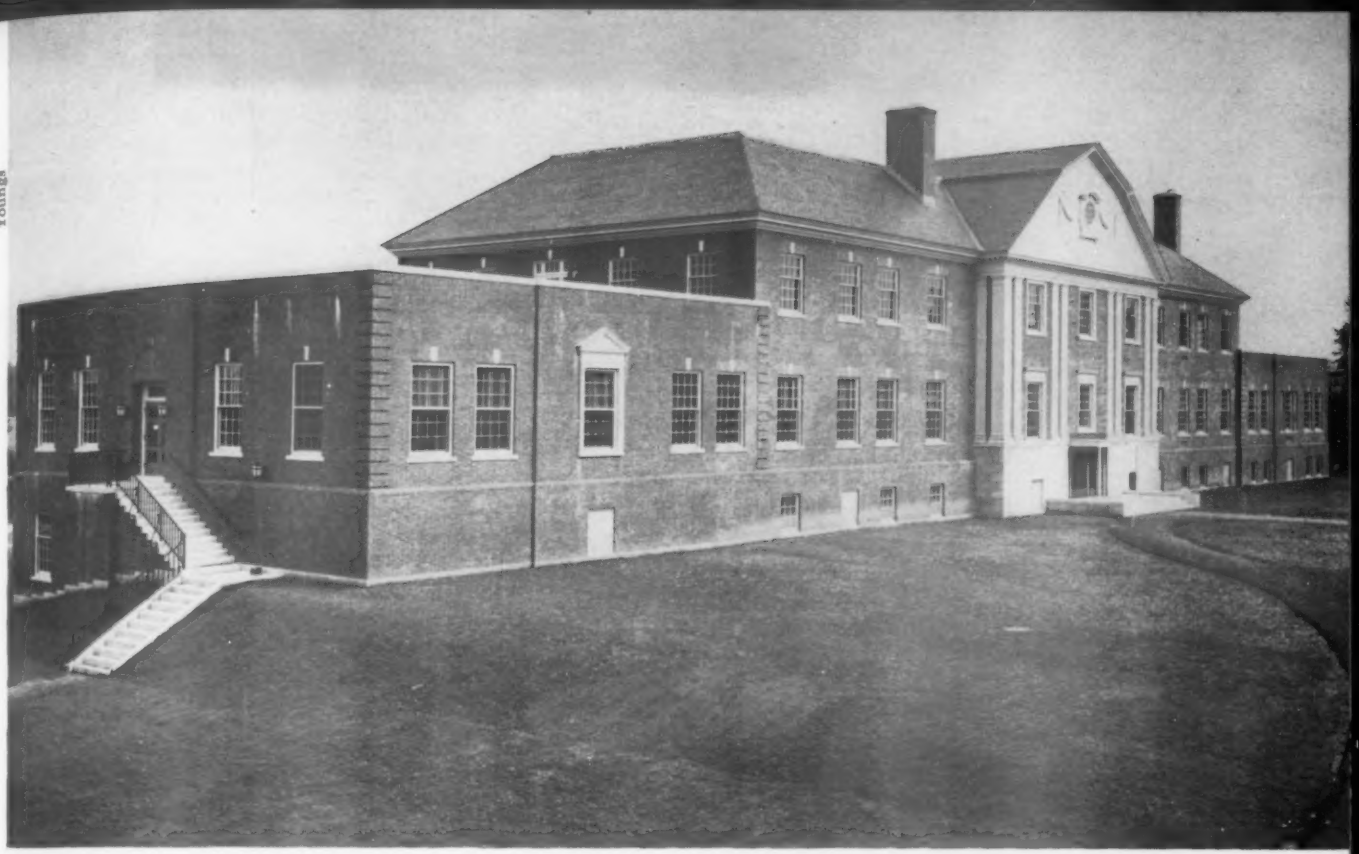
A large lobby and concourses off the balcony and ground floor provide access to other parts of the building. The ground floor houses men's and women's lounges, the studios of the college radio station, speech office and classrooms and the heating and ventilating plant.

The area below the auditorium has been very highly developed by the college to include an Air-ROTC rifle range, sound-proof organ practice rooms, band practice rooms, complete radio station with two studios and control room and two classrooms for the speech department. The building is heated by hot water pumped underground from the main boiler room through a heat tunnel. The auditorium is ventilated by means of fans and is zoned to control various areas independently, with the heat being introduced through the ceiling and exhausted through mushrooms located under the auditorium seating.

Serves College and Community

Cowan Hall is truly a multi-purpose building serving both the needs of a small liberal arts college and the city of Westerville, Ohio, where it is located. It is designed to be so used for musical and drama presentations that it will largely pay its own way through public patronage.

The building contains a total of 733,000 cubic feet at a cost of 56.2 cents per cubic foot. It was built in 1950 and dedicated in 1951. The total cost was $412,000, including the general contract, heating, plumbing, electrical, stage equipment, auditorium seating and architects' fees. The architects of Cowan Hall are Benham, Richards and Armstrong of Columbus, Ohio.



University of Maine's Memorial Union. Architects are Cram and Ferguson of Boston.

MEMORIAL UNION FOR UNIVERSITY OF MAINE STUDENT ACTIVITIES



by BROOKS W. HAMILTON

Head of the Department of Journalism, University of Maine

A native of Massachusetts, Brooks W. Hamilton was graduated from Bates College, Maine, in 1941. At the time of his appointment as head of the department of journalism at the University of Maine in 1952 he was city editor of the *Daily Kennebec Journal* in Augusta, Maine.

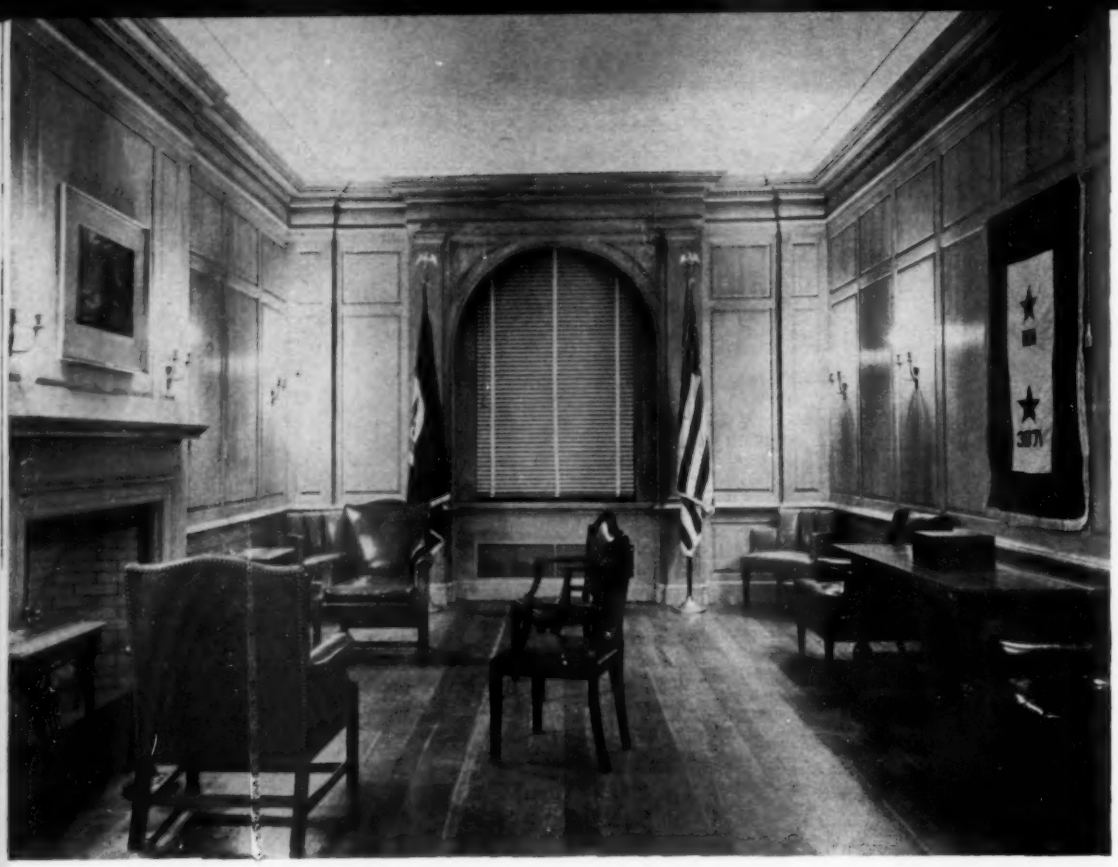
UNIVERSITY of Maine's new Memorial Union building, dedicated May 17, 1953, serves as an undying, useful and appropriate symbol of tribute to alumni and students who served the Nation in World War II. Dedicating the building on that day, University President Arthur A. Hauck described its purpose in these words:

> To broaden and deepen friendships between student and student and between student and faculty—and to enhance the social and cultural life of the University.

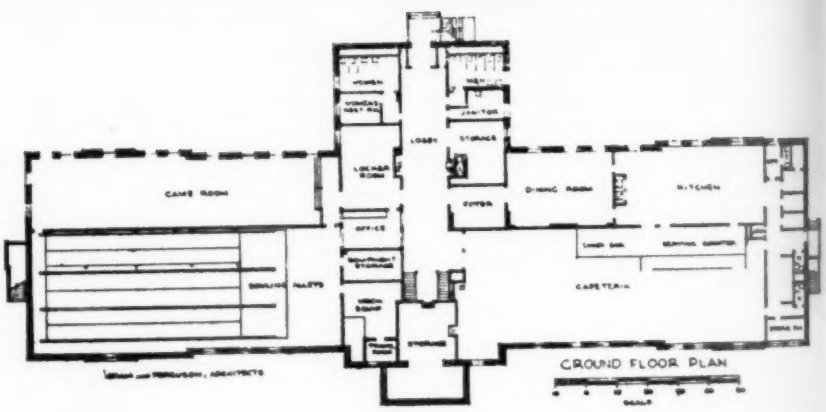
This, in concise and descriptive terms, expresses the purpose of a student union on any campus. The idea of a student union as a welding process to bring students together and to include the faculty with a balance of adequate and evenly adjusted social life was well applied to the University of Maine.

Postwar expansion was a difficult transitional period for this state university, as indeed it was for many institutions. Dedicated many years ago to the task of serving all youth of Maine educationally and supported in part by tax money, the university could not and would not turn its back upon veterans who streamed back from the war, swelling the regular enrollment. The campus had to grow and grow quickly.

One direction of growth was in providing for the social life of the students, for we all have come to ex-



Memorial Room in the Union. The Book of Memories, seen on the table at the right, contains pictures and biographies of the 181 Maine men who gave their lives in World War II.



Ground floor plan. Here are located the bowling alleys, game room, dining room, kitchen and cafeteria.



The first floor contains meeting and conference rooms, lounges and the Memorial Room of the building.

pect social development as a benefit of college life as surely as we have always expected development of the brain and mind. When the General Alumni Association met in 1946 to consider the matter of a fitting memorial to World War II veterans among alumni and students, and especially to those 181 who had given their lives, this facet of campus life was recognized as a great need.

At that time there were few large enough places on campus for planned or unplanned social activities. There were two small snack-lunch bars and a few other locations given over to specialized activities.



The spacious main lounge of the Memorial Union Building. This room measures 51 by 64 feet and stretches across the southern end of the building. The table with the lamps, at left, is located in the approximate center of the room. Flooring is asphalt tile.

The need was for a centrally located building big enough to house these regular activities, plus room for a new, planned program of social development that would bring together students of diverse interests from different dormitories and fraternities, and even those who commuted daily from home.

It might be mentioned that the new university library, another project completed in the early post-war period, had done its best to serve as a social center; but in a university a library must first be a library, and must be primarily geared to academic work.

The Fund Raising Campaign

The Alumni Association voted to raise funds for a Memorial Union and $900,000 was set as a goal. This amount was over-subscribed, but rising costs of materials and labor forced the university to open the Union slightly short of interior completion. Through the Alumni Council's fund raising campaign 12,328 students, faculty and friends of the university, as well as alumni, subscribed $903,525 for the Union. This included a $50,000 unrestricted bequest which the Trustees allocated to the Union. Particularly impressive was the contribution of students. Of those in school during the campaigns, 6,035 pledged a total of $183,801.

Up to now, construction has cost $750,000, plus another $50,000 for equipment. It is the Alumni Association's plan to add a large auditorium in the rear of the present building at a future date.

Cram and Ferguson, architects of Boston, were commissioned early in the fund campaign to design the building. The outside was to conform with the general type of campus architecture already existing where the building was to be located. Inside, the arrangement was carefully planned to provide fulfillment of the functions of the Union.

They created a pleasing, colonial type of structure which, upon its completion, did indeed harmonize



Second floor of the Memorial Union is not yet completed. It will contain rooms for various campus activities and an alumni-faculty lounge.

and blend with its surroundings. Interior decoration was planned and supervised by Mrs. Helen Taylor of Philadelphia, well-known colorist.

Consolidated Construction Company of Portland was the principal contractor for all work, except grading, landscaping and the running of utility lines into the building. These jobs were carried out by the university's own grounds and maintenance staff. Ground was broken for the building in July, 1951, and the foundation was completed before winter of that year. The building was completed during 1952 and 1953. As the plans indicate, the Union is designed to care for almost any social or cultural program. The entrance, off the college mall, is on a split level.

Inside Areas of the Union

At the lower level is the "Bear's Den," a large and well-equipped lunch and coffee rendevous. This modern cafeteria-snack bar fast has become the favorite of students and faculty. Eventually more food services will be available here, and in the planning stages are bowling alleys and a game room.

On the main floor is a large, cheerful lobby with an information booth and newsstand dominating one side, with bulletin boards and posters advertising the Union's various activities. On the right, as one enters the lobby, is a room all visit sooner or later. Here, in a small informal room richly paneled in Maine pine, is a Book of Memories, containing the pictures and biographies of the 181 Maine men who gave their lives in World War II. It is a place for quiet reflection where one realizes that university life approaches better things because of this fitting and purposeful memorial.

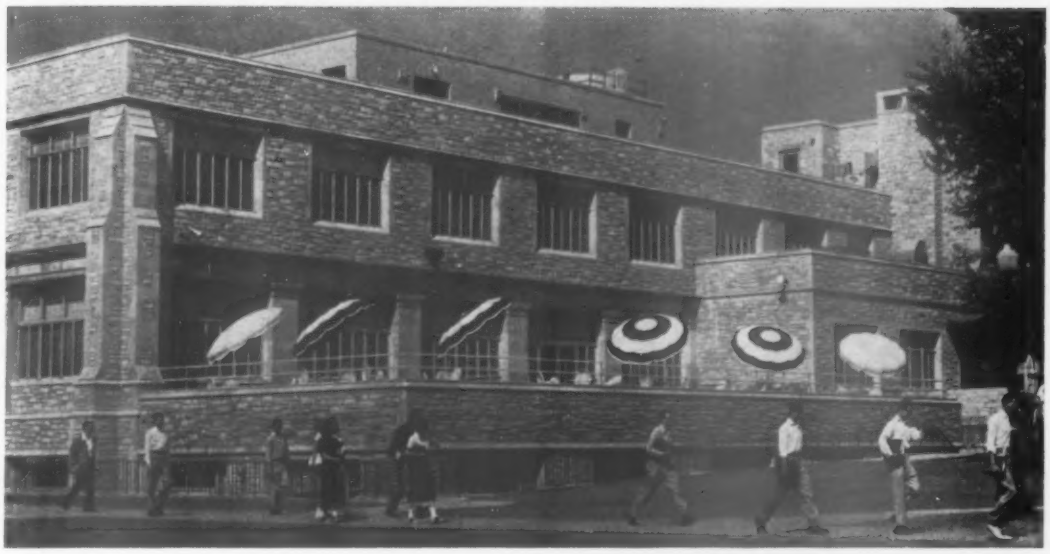
In the south wing of the building are two lounges for men and women; and a main lounge that stretches across the southern end of the wing. This is a livable and friendly place where many students come during the day for relaxation and study. This room measures 51 by 64 feet, with over 3,000 square feet usable.

Meeting Room and Offices

In the north wing are several meeting rooms of various sizes. The largest, the Bangor Room, has a capacity of 150. Offices for a full-time Union director and his staff are also maintained temporarily on this floor.

The second floor, not yet completed, will contain rooms for various campus activities and an alumni-faculty lounge. The director's offices will eventually be located on this floor. Activities such as publications (the student newspaper), religious organizations, the campus radio station, etc. will have their own quarters here too.

AT UNIVERSITY OF MISSOURI:



STUDENT UNION MEMORIAL FOR TWO WARS



by JACK C. TAYLOR

Assistant Director, Office of Public Information, University of Missouri, Columbia

Mr. Taylor has held his present position with the Office of Public Information at the University of Missouri since 1949. A former newspaperman, he edited small dailies in Missouri and Illinois for eleven years and served with the Associated Press in Chicago and New York for four years. Mr. Taylor also edited two house organs for the Missouri Farmers Association. He was a student at the University of Missouri in 1928–30.

THE $2,100,000 Memorial Student Union, long a cherished dream at the University of Missouri, stands majestically as the north wing of Memorial Tower, matching the Tudor Gothic architecture of that famed campus landmark.

A popular center of university life since its opening in September of 1952, the Student Union is serving ideally in the varied functions envisioned for it over the years.

Into this splendid structure went hopes and plans spanning more than a quarter century. Originally the project called for a south wing and a north wing, with the Tower in the center. A campaign for public subscriptions provided the Tower, which was dedicated in 1926 as a memorial to university students who died in World War I. A start was made on the south basement foundation; but the Union Building was to face a long delay, due to fund-raising difficulties, another world war and spiraling construction costs. At last the north wing was completed and dedicated to the memory of university students who gave their lives in the Second World War. Ultimately, when funds are available, there will be a south wing.

Showplace of the Campus

Currently the Student Union is the showplace of the Missouri campus, even though other recent buildings are also outstanding and more major projects are under construction.

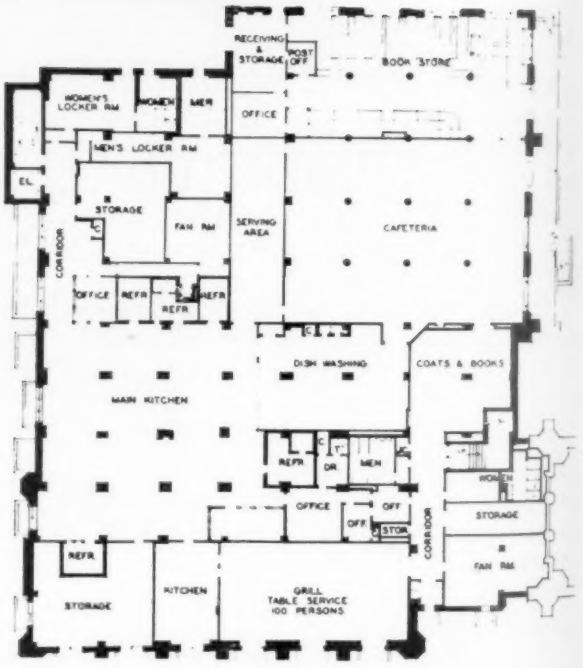
The building has a reinforced concrete and structural steel frame, and all the construction is fire-resisting. Particular attention was paid to provide all the



Main lounge of the Student Union is located on the first floor of the building. Acoustic tile ceilings reduce noise.



Memorial Lobby before the plaques were installed. The marbles used in the floor design came from Africa and Italy. Walls of the lobby are of light oak paneling. At right is a plan of the ground floor of the Student Union. The building was designed by architects Jamieson, Spearl, Hammond and Grolock of St. Louis, Missouri.



safety measures, such as adequate exits and enclosed stairways, necessary for the handling of large numbers of people.

The walls are made of local Missouri limestone with cut stone trim, which is true of all the buildings on the university's east campus. This unity in design and materials has been maintained through the years despite the changes in passing architectural fashions and philosophy. By contrast, buildings on the older west campus traditionally are of red brick with cut stone trim.

The windows have Gothic tracery around steel frames. The high points of the structure are accented with ornamental details in carved stone, a feature which is often overlooked in these days of barren simplicity. Two corner towers are surmounted with pinnacled turrets. The architects gave the utmost care to these exterior features to make them like the original Gothic details.

Modern Interior Treatment

The entire interior treatment architecturally is rather modern in form because it is influenced by the requirements of air conditioning, fluorescent lighting and other mechanical equipment to make rooms suitable for their purposes. All have a rather simple design with broad surfaces and concealed and flush lighting. The rooms rely on stimulating colors, drapery

materials and furniture for their effects. Ceilings of acoustical tile are effective in reducing noise. Attractive light-green glazed walls enhance the appearance of the cafeteria, the stairways and basement.

Full Utilization of Areas

The Student Union, twenty-two months in construction, is functional in design. It offers full utilization in a variety of services on its three floors. The ground floor–in reality the basement–is dominated by dining facilities. The main kitchen, the cafeteria and the grill room are located there. In addition, a book store is operated for university students.

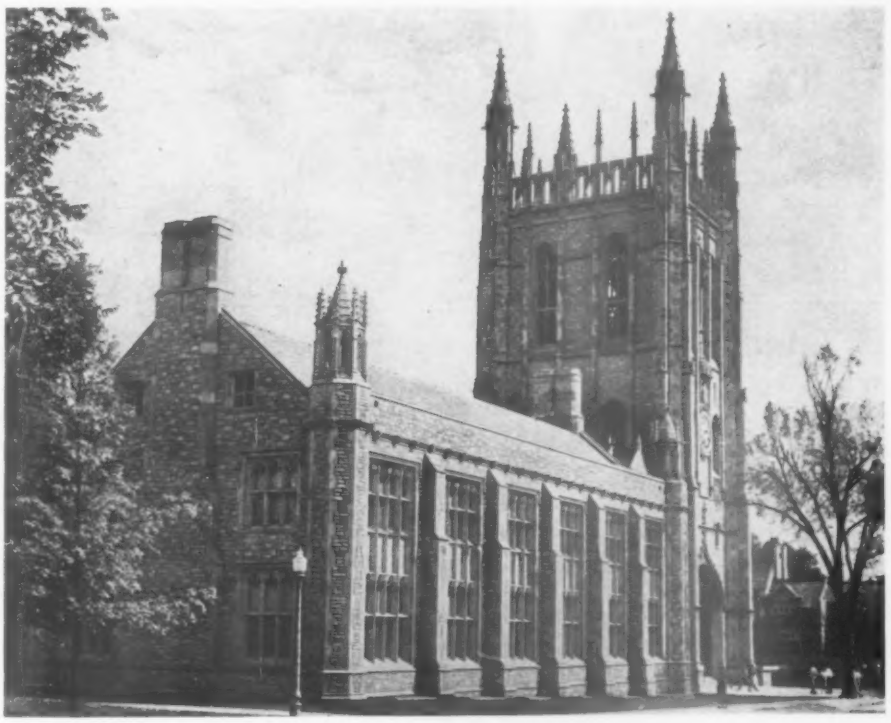
The first floor, which is at ground level, caters to the students' leisure hours with its spacious main lounge, the Memorial Lobby, the large soda shop and the terrace.

On the second or top floor are two ballrooms and numerous rooms for meetings. Each floor has a number of offices.

The visitor making a tour of the building enters from the Memorial Tower archway, coming to the impressive Memorial Lobby finished in dignified simplicity. There he sees the dedicatory tablet stating the purpose of the building. Other bronze tablets are inscribed with the names of those University of Missouri students who gave their lives in World War II. These plaques are placed on the north and south walls of this room. The names of First World War dead are carved in stone in the archway.

In the center of the room's marble floor is an inlaid emblem encircling the letters MU in black and gold against a rust background; the marbles in this design came from Africa and Italy. The Memorial Lobby walls are of light oak paneling, the same as those of the adjoining main lounge.

A popular meeting and resting place for students between classes is the main lounge which is 45 feet by 110 feet in size and is furnished with a variety of sofas and chairs. It also has several table-desks, a television receiver and newspaper and magazine racks. The walls are covered with wood veneer and the floor has gray carpeting. Well chosen drapes add to the restful atmosphere. A giant wood-burning fireplace is in the north wall, and another is in the south wall.



Northwest view of the Student Union. The Memorial Tower was dedicated in 1926 to the University students who died in World War I. Architectural style of the Tower is Tudor Gothic. The entire building project will ultimately include a north wing, now completed, and a south wing, to be finished when funds are available.

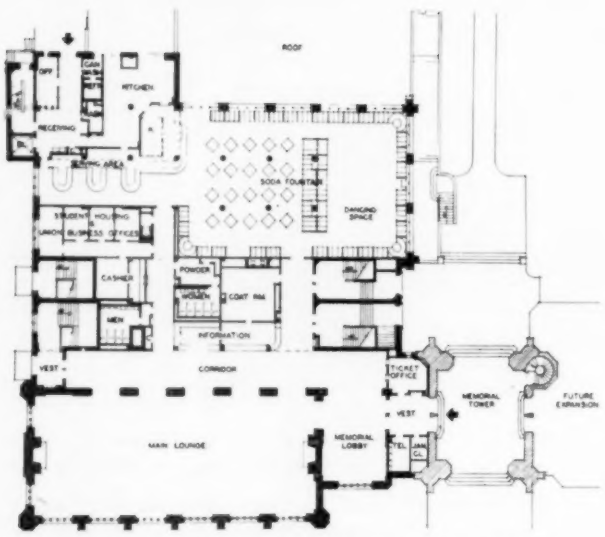
To the east of the lounge is the principal corridor with information desk, check room and a small shop for the convenience of the students.

Two hallways lead east from the corridor into the large soda fountain room which occupies the entire east side of the first floor. Nearly 300 persons can be seated at tables and in leather-covered booths and at three small counters. Students occupying the booths and tables first go to the self-service counter for their snacks and soda fountain drinks. The serving area is supplied by an adjoining kitchen. There is a floor for dancing at one end of the soda fountain room.

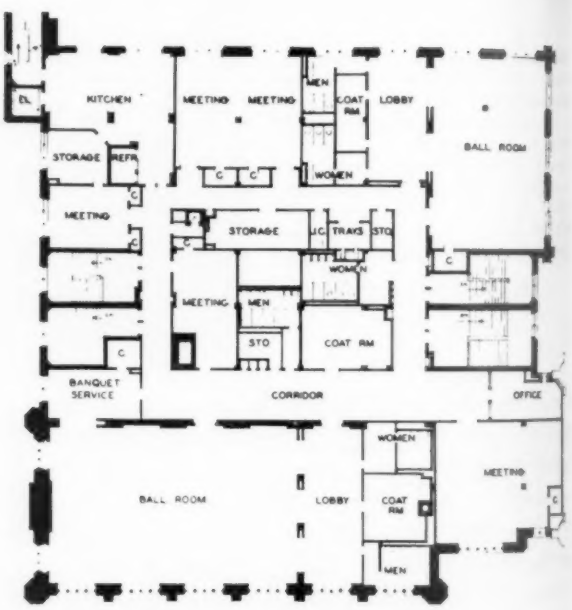
The arrangement of this room was developed after university authorities visited union buildings on other campuses to see what facilities were most desirable. The emphasis on this idea has been well justified by the room's popularity.



Terrace on the east side of the building. The terrace has the air of an outdoor cafe with its umbrellas, tables and chairs. There is also an area for dancing. Below is the second floor plan of the Student Union.



First floor plan of the building. The Union's business offices are located here. All facilities are adaptable for many uses.



Opening directly from the soda fountain room is the terrace which overlooks the east campus. About 88 persons may be accommodated here where the atmosphere is that of an open air cafe, furnished with attractive outdoor tables, chairs, gay umbrellas and a floor for dancing.

The Union Building's business offices are located on the first floor, just off one of the corridors leading to the soda fountain room. Various ticket windows are also on this floor. During the summer months a staff from the university's Admissions Office based in Jesse Hall, the administration building, handles much of the pre-registration work for the fall semester in the Union. Facilities there are quickly adaptable, and the air-conditioned comfort of the building doubtless appeals to the prospective students and their parents who come with them to the campus.

The visitor, making his way to the second floor, will realize that the favorite attraction there is the large ballroom. Directly above the main lounge it is of similar proportions and accommodates approximately 400 dancers or about 300 persons at meetings and banquets. The dominant color in this large room is green, the walls being lighter in shade than the flooring. One end of the room serves as a lobby and can be partitioned off by plastic folding doors.

Also on the second floor is a smaller ballroom with a capacity of about 174 persons at dances, and



Memorial plaque for students of the University of Missouri who gave their lives to their country in World War II, 1941–1945.

usable for banquets and meetings. It also has a lobby which can be made into a meeting room. Both the large and small ballrooms are complete units within themselves, having their own rest room and checking facilities. They have been utilized for a wide variety of group activities.

Just south of the large ballroom is a good-sized meeting room, tastefully furnished and available as a lounge. On this floor are two other rooms for meetings, one of which may be divided into two units by use of a folding door.

Among other second floor features are a music-listening room, and offices for the Student Union program director, Student Government Association and Student Union Activities Board. In addition, there is a catering kitchen that makes it possible to serve luncheons or dinners in any of the meeting rooms or ballrooms. An elevator and dumbwaiter from the main kitchen on the ground floor facilitates this service to all floors. The main corridor on the second floor lends itself to art exhibits and other displays.

Food Service in Basement

The visitor, having inspected the two floors above ground, goes next to the basement where the accent is on service—mainly in the preparation of meals. Here the visitor finds the cafeteria with 225 seats where lunch and dinner are served, the grill room of 100 seats for those wishing table service in dignified surroundings and, along the east side, the bookstore with



Memorial plaque on the south wall of Memorial Lobby also contains names of university students who died in World War II.



President Frederick A. Middlebush of the University was the first patron to be served when cafeteria of the Student Union opened.



Grill room in the basement. Approximately 100 persons may be seated here. Meals are more elaborate than cafeteria's menu.

its own entrance. Here also is the main kitchen and dishwashing room serving the entire building for regular meals, banquets, luncheons and receptions. Offices of the food management personnel, where menus may be selected for special parties, are on this floor, situated near the kitchen and the cafeteria.

While the basement is more or less the "workroom" for the Union Building, with emphasis on practical surroundings, it is none the less attractive and a highly efficient arrangement.

The cafeteria has entranceways from the outside as well as from the interior of the building. The serving unit is closed off by a wall, thus keeping noise to a minimum in the area where the patrons are seated. The grill room features more elaborate meals.

Occupying a large area of the ground floor is the main kitchen—60 by 62 feet—where the finest equipment for food preparation is in operation. Much of this equipment is stainless steel. Off the kitchen is a complete automatic dishwashing unit. There is also a small kitchen near the grill room to supplement the service of the main unit. The ground floor has locker rooms, fan and equipment rooms, refrigerators and storage rooms.

Two-Level Sub-basement

Almost unknown to the public is the existence of the Union Building's sub-basement which actually has two floor levels. The lower level contains mainly coolers and compressors for the refrigeration units, and the higher one houses electrical machinery. The total floor space of both levels is 50 by 60 feet.

Another feature that escapes public notice is the machine room on top of the building where most of the air conditioning equipment is housed. It occupies a floor space of 60 by 70 feet and has eleven supply fans and seventeen exhaust fans.

Financing of the construction was made possible by a limited number of gifts available for such use, unrestricted funds received from sources other than state appropriations, a $300,000 state appropriation and funds received from the sale of $600,000 in revenue bonds. These bonds will be retired with funds provided by income from the building and by Student Union fees of $7.50 a semester paid by students.

The costs of the janitor service, gas, water, electricity and steam are charged to the General Management Fund and considered a part of the university's contribution to the operation of the Union Building. This arrangement is in view of the fact that a few university classes are conducted in the Union, that various university functions are held there, and that faculty members and alumni have pledged money in the past for construction of the Tower and the south basement foundation.

Attendance figures show how actively the Union is being used by students and faculty. By the spring of 1953 attendance at activities was averaging nearly 16,000 monthly. This was exclusive of food service. In the Union's first eight months of operation, 23,179 persons attended Student Union Activities, 48,659 attended functions sponsored by other student organizations and 31,626 attended faculty and departmental activities.

Enthusiasm for Building

The Memorial Student Union, eagerly and heartily accepted as a new experience in campus life at the university, is a source of pride among Missourians. Many an undergraduate has asked, "How did we ever get along without the Union?" And often a returning alumnus has sighed, "I wish we'd had something like this when I was in school." Their enthusiasm is shared by faculty members and all visitors.

DRAKE UNIVERSITY'S NEW RESIDENCE HALLS



by ROBERT L. STUHR

Director of Public Relations, Drake University

Mr. Stuhr received his A.B. degree from Drake University and holds an M.A. degree from the State University of Iowa. During World War II Mr. Stuhr attained the rank of captain and was awarded the bronze star and two combat stars. He was appointed to his present position in 1950, after having served as alumni secretary at Drake since 1947.

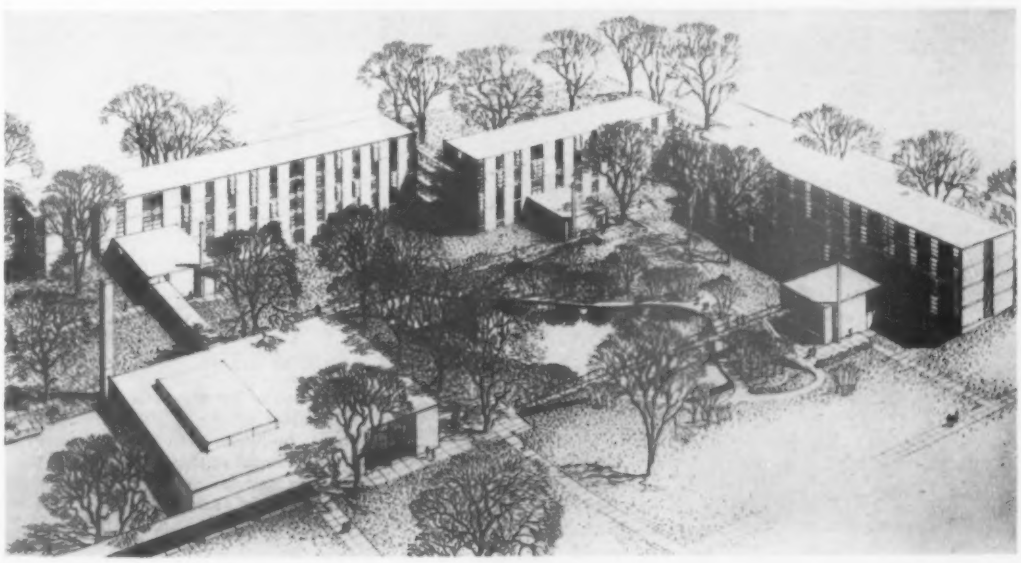
WITH the completion of three new dormitories and a central dining hall, Drake University in Des Moines, Iowa, has more than tripled its housing accommodations for resident students. The new dormitory project has a capacity of 585 students which, added to the 216 existing units, brings the total capacity of Drake residence halls to 791.

The new, functional, strikingly modern domitories are Drake's answer to a need for more student housing. This need became urgent with the increase of students from outside Des Moines at the end of World War II.

The new dormitories, built at a cost of $2,600,000, are designed by Saarinen & Associates of Bloomfield Hills, Michigan, who were commissioned by the university in 1945 to design the Drake campus of the future. The first two buildings completed were Harvey Ingham Hall of Science and Fitch Hall of Pharmacy which have attracted nationwide attention since they were opened for use in 1949.

Located in a wooded ravine in a newer section of the campus, the dormitories were planned to take advantage of the contour of the site and of the picturesque area. The low point of the ravine has been made into a reflecting pool about which the three residence halls and the central dining hall are grouped. Bridges connect two of the dormitories with the dining hall. Open, lighted balconies inter-connect the three residence halls. Each dormitory is five stories high with the main entrance on the second or third floor. The walls of the dormitories are of concrete slab with brick veneer.

Eventually the three halls will be for women;



Artist's view of the new dormitory project completed at Drake University, Des Moines, Iowa, at a cost of $2,600,000. Designed by Saarinen and Associates, the project will house 585 students.

however, for a few years one will be used for men. The dormitory now occupied by men is 197 by 40 feet and accommodates 201. Dormitory Two is 171 by 40 feet and houses 152 upper-class women. Dormitory Three, the largest, measures 223 by 40 feet and has a capacity of 232 freshman women.

Student Accommodations

The student's room in the new dormitories is designed—in keeping with the precepts of modern architecture—for comfort, convenience and efficiency. The rooms are trim, light and of modern decor. Most of the rooms are double; however, there are 49 single rooms, located on the ends of each floor of the three halls.

The double rooms are 16 by 13 feet. Each student has his own bed, chair and combination dresser-desk. Each has his own wardrobe with a sliding door. There are two wide shelves at the top of the wardrobes for extra storage space. Every student also has bookshelves—giving 12 feet of space for books. The beds have bolsters which enable them to be used as lounges during the day.

In each room windows extend from floor to ceiling and can be opened in three panels. A window seat at the foot of the window offers extra seating. Students also have their own tackboard and mirror above the desks. Rooms are equipped with a buzzer so that the dormitory switchboard may signal for telephone calls or visitors.

Social Areas of the Buildings

In addition to the facilities of his own room, each resident has access to a living room, a recreation room and a social room. There is a living room on each floor of the three buildings. It is equipped with a sofa, card table and chairs, typing table and built-in ironing board and kitchenette. Here a student may come to type, study or listen to the radio. Large picture windows look out on the reflecting pool and landscaped area.

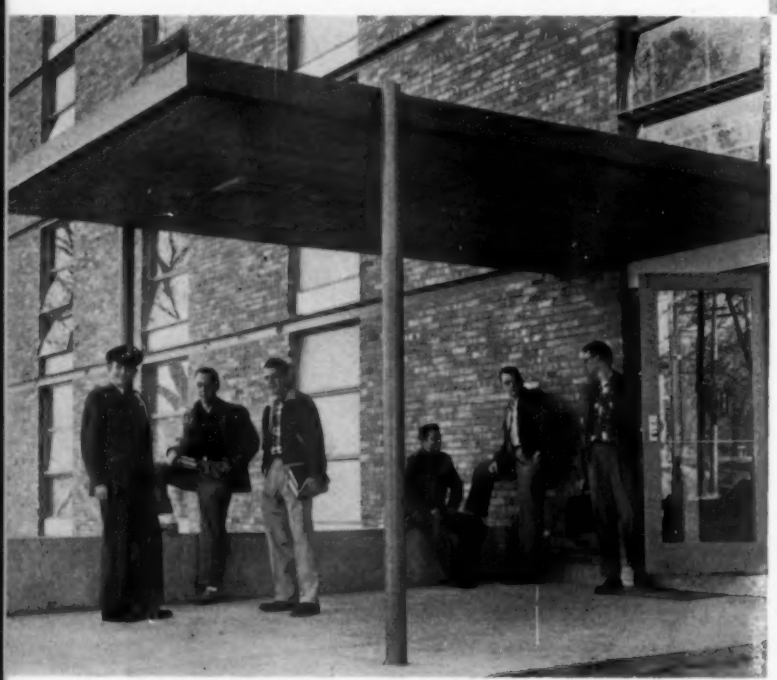
Each dormitory has a recreation room and a social room. The recreation room has sofas, lounge chairs, television set, ping-pong table and equipment for other games. It is open only to residents of that particular hall.

Highlights of the residence halls are the gracefully designed social rooms or parlors. There is one in each of the three dormitories. The parlors have brick floors, large two-story picture windows and modern-

Marion Pease

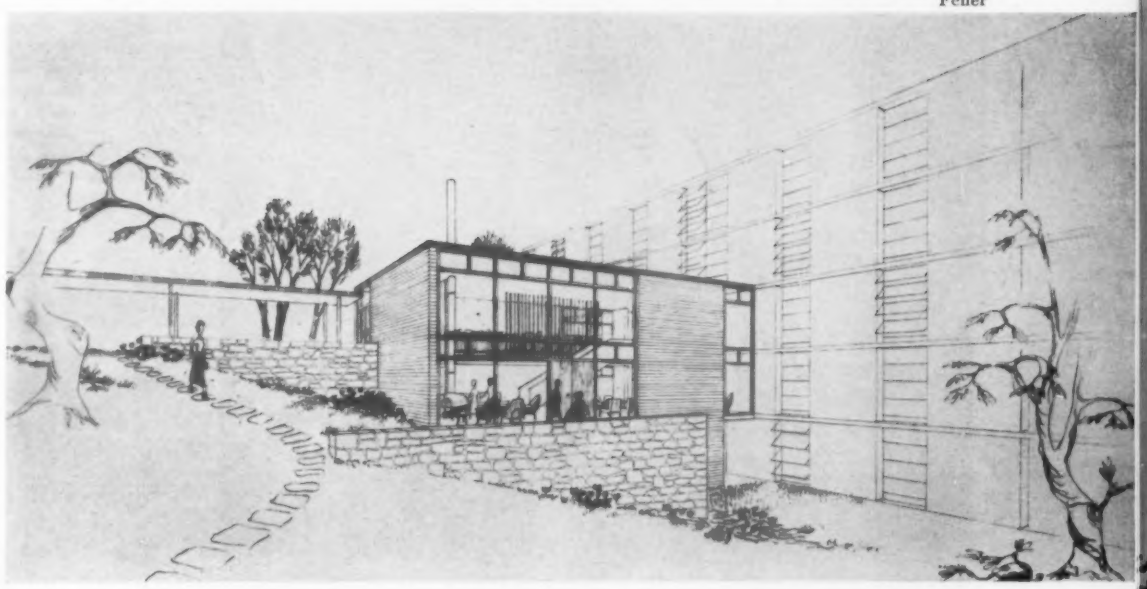


Students find the trim, well-lighted and modern decor of Drake's new dormitories just right for studying. Combination dresser-desks and other furniture were especially designed for the dormitories.



Entrance to Dormitory One for men. The color of the brick in the four new buildings of the dormitory project matches the brick of nearby Harvey Ingham Hall of Science and Fitch Hall of Pharmacy. Each of the dormitories is five stories high.

Feiler



Architect's sketch of the exterior of the two-story social room of the dormitory for freshman women. The entry way to the left approaches from the central dining hall and enters the top story of the social room. Large, two-story picture windows offer pleasant views of the reflecting pool.

istic black steel fireplaces suspended from the ceilings. Students enter the residence halls by bridges from the central dining hall. The bridges join the top floor of the social rooms and pass along the upper level of the room. Smartly styled stairs descend from the bridges or balconies into the social room.

Color and design play an important part in making the social rooms the showpieces of the project. The lounges, easy chairs, sofas and other furniture have been designed in large part by Knoll & Associates. A grand piano will add to the pleasure of students using the rooms. Just outside each social room is an all-electric kitchen with facilities.

Dining Facilities

All dormitory residents will eat in the spacious, two-story Central Dining Hall. The entire top floor is a student dining area. Students enter by way of stairs on the east and west sides and find two self-service lines which they pass along before proceeding to small tables.

The second floor of the dining hall overhangs the first, giving a terrace effect. Floor-to-ceiling high picture windows look out on the reflecting pool and the three residence halls. On the ground floor is a snack bar and soda fountain and private dining rooms. By the use of accordion folding doors as many as four private rooms can be created for the use of student groups, fraternities and clubs. Dormitory residents who meet with groups using the private rooms for meals may apply their contract meal on the cost of luncheon or dinner served the group.

Long underway in planning, the dormitories are a source of pride to the Drake family. Dr. Henry G. Harmon, president of Drake, comments: "Because a student's opportunity to mature comes from outside as well as inside the classroom, Drake takes pride in offering the kind of dormitory facilities which will help promote this maturity. After all, education comes from more than books. It cannot be developed solely in the classroom or seminar, or alone in the quiet of the library. The physical environment of the student during his years in the university is an important factor in his educational experience."

The cost of the dormitories—$2,600,000—has been financed by means of a government loan and gifts from alumni and friends. A loan of $1,000,000 was obtained from the Housing and Home Finance agency of the Federal Government from funds designated for university and college housing. The loan has an interest rate of 2¾ percent and will be amortized over a 40-year period on a self-liquidating basis. More than 1,600 alumni and friends contributed to the remainder of the cost in gifts ranging from $1 to $230,000.

New Construction Techniques

New construction techniques were used in the project. The walls of the dormitories were precast in slabs or panels and moved to the building site. This enabled casting to be done simultaneously with the erection of walls on the site.

Ground-breaking of the project was in April, 1952. Scheduled for completion on September 1, 1953, the dormitories were delayed until fall by a ten-week statewide building trades strike in the summer of 1953.

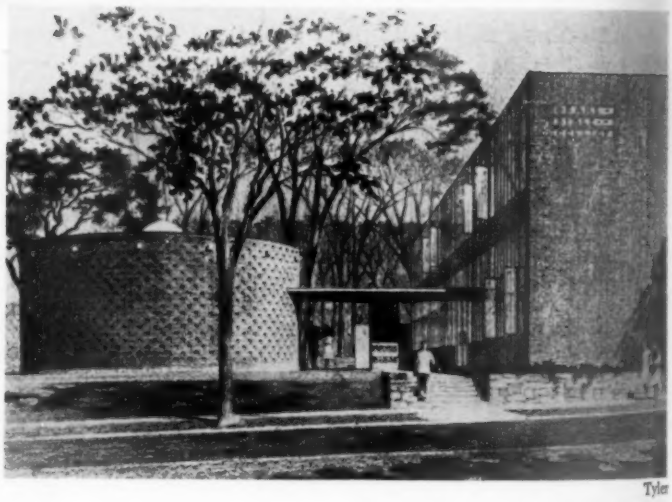
Two Buildings Planned

With six new buildings, designed by Saarinen, now completed, the Drake campus is looking forward to beginning construction on two more—a new Divinity School building and a Memorial Chapel. These two buildings are expected to cost $255,000. The chapel is the gift of Oreon E. Scott, a member of the Drake board of trustees and an outstanding layman

Richard Shirk



Square building at top, left, is the Central Dining Hall. Students will be served cafeteria-style on the top floor. Ground floor consists of private dining rooms and snack bar. The building in the foreground holds 201 men students. Dormitory at lower right accommodates 152 upper class women students. Dormitory in upper right accommodates 232 freshman women.



Tyler

Next buildings to be constructed on the Drake campus are the Divinity School building and a Memorial Chapel, scheduled to be started in the winter of 1954. The chapel will be round and will be for the use of all students for prayer and meditation. The buildings are similar in design to the other Saarinen buildings on the campus. Other buildings scheduled for construction later are the Meredith Hall of Journalism and a liberal arts classroom building.

in the Disciples of Christ churches. The chapel will be of unique design–round, with a diameter of 30 feet. It will have a round, transparent plastic dome. The chapel will be open to all students for prayer and meditation and will seat about 20 persons at a time.

The completion of Drake University's new dormitory project, with the opportunities it offers for student living, will help the university reach its goal which, in the words of President Harmon, is "to help the student develop such characteristics and acquire such knowledge as is of greatest value to him in his growth toward social, intellectual and spiritual maturity."





Cosmas V. Cosmades

Freeman Hall, above, and Bates Hall, left, new dormitories at Wellesley College. Both were designed by Shepley, Bulfinch, Richardson & Abbott, Boston.

DORMITORIES FOR WELLESLEY COLLEGE



by JOSEPH P. RICHARDSON

Shepley, Bulfinch, Richardson & Abbott, Architects, Boston, Massachusetts

Mr. Richardson is a graduate of Milton Academy and has an A.B. degree from Harvard College and a Bachelor of Architecture degree from the Harvard Graduate School of Design. He has been a partner in the firm of Shepley, Bulfinch, Richardson & Abbott since 1952. Mr. Richardson served in the USNR from 1942–1945 as a Lt. Commander and was awarded the Bronze Star. His specialties as an architect include design, planning, supervising, engineering, contracting and dealing with clients.

WITH the completion of its new dormitory group, for the first time since 1886 the entire undergraduate body at Wellesley College, Wellesley, Massachusetts, is completely and comfortably housed on the 400-acre campus. This is the result of years of planning and coordinated effort on the part of President Margaret Clapp and the college trustees. They had been particularly concerned with the many problems resulting from the use of wooden houses in the village which made it necessary for students to travel to and from the campus on busy thoroughfares. These houses were also a burden to maintain.

The tremendous advantage of having all girls live on the campus had been foreseen for many years. Unfortunately, whenever funds for the new dormitories became available either war, world crises or inflation made it necessary to abandon plans. The college is to be congratulated for its faith and vision in proceeding with its plans for new dormitories.

Three Separate Dormitories

The problem, as finally given to architects Shepley, Bulfinch, Richardson and Abbott of Boston, was to design a dormitory group for 411 girls. The dormitory group was to be divided into three separate houses, each house to maintain its own identity and



Site plan of the dormitory group showing building floor plans at entrance level. Every step was taken to preserve the natural beauty of the site and to spare the surrounding trees.

to have its own front door, control desk and living and dining rooms distinct from the others.

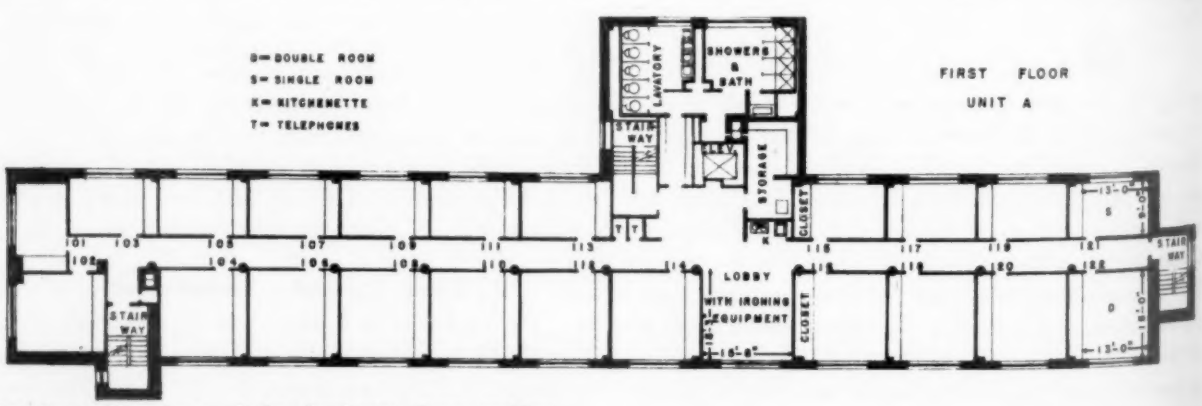
Two dormitories, each housing 137, and three dining rooms have been completed. Unfortunately, the budget did not permit the construction of the third building which would have housed the students presently living in other campus buildings. However, these girls use the third dining room in the new group for their meals.

Bates Hall and Freeman Hall are located to the south of the college infirmary. Every step has been made to take full advantage of the natural beauty of this sloping site with its magnificent trees. By ingenuity in the planning it has been possible to save all the copper beeches and also to incorporate Christmas Tree Alley into the overall design. Mr. John Rood, the well-known sculptor, has designed and executed two fine pieces for the sculptural court.

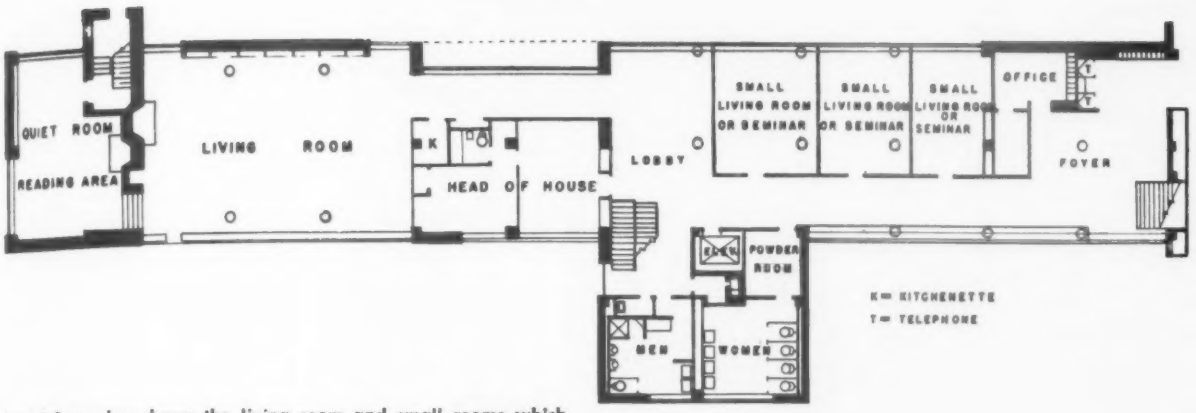
Maintenance Costs Reduced

President Clapp and the Wellesley trustees strongly emphasized the necessity of reducing maintenance costs of the buildings to an absolute minimum. Special care was exercised in the selection of materials and methods of construction. To keep first costs at a minimum, also, the planning was such that no square foot of space was wasted nor any amounts allotted to purely aesthetic embellishment.

The architects prepared a series of six separate designs for this dormitory group, the present scheme being the seventh. This series of designs forms a graphic record of the development of the philosophy



First floor plan of one of the dormitories shows positions of single and double rooms. Each room has built-in bureaus.



Second floor plan shows the living room and small rooms which are available as additional living rooms or for informal seminars.

of the new buildings. The first design prepared was similar to existing campus buildings of the three-sided quadrangle type. The later designs evolved gradually until the present layout appeared.

Exterior and Interior Treatment

The exteriors of the buildings have been carefully studied in proportions, fenestration and materials to make sure they conform with the spirit of the college. The red brick and white window trim, the fieldstone at the first floor, the varied levels and the carefully graded landscape all contribute to a feeling already prevailing at Wellesley College, and unaffected by period or style.

The interiors have been treated simply and directly with all finishes selected from the point of view of harmony and wear. Colors, as well as the lighting effects, were selected to avoid sharp contrasts. Light tones were used to create a feeling of airiness. All contribute to a general effect which is quiet, cheerful, spacious and, above all, non-institutional.

Olive Sawyer



This long cafeteria counter is divided into three sections, one for each dining room. It is used to serve breakfast and lunch only.

Common Kitchen and Cafeteria

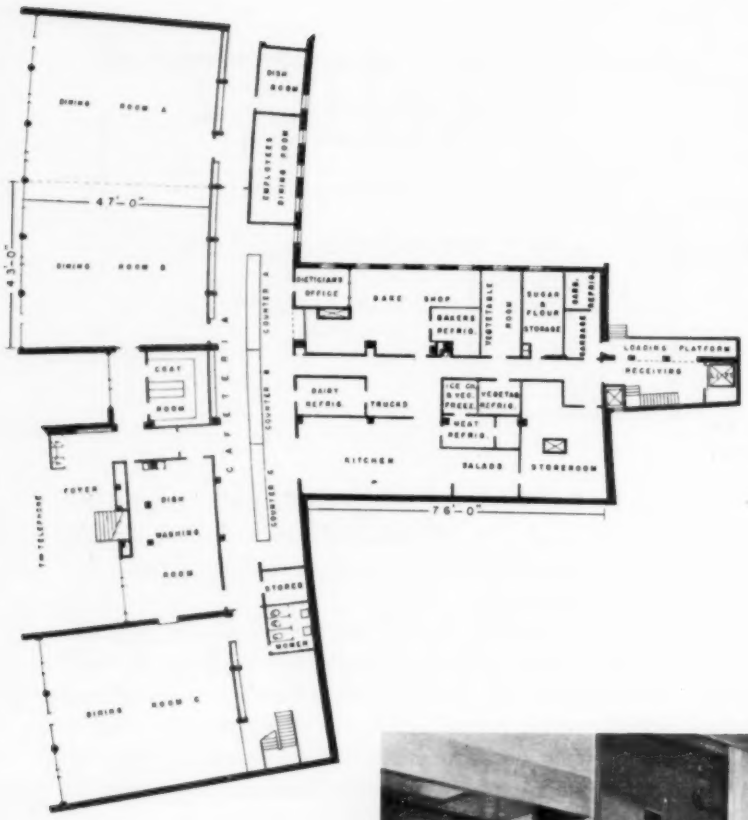
One outstanding feature of the plan is that, although each building has its own dining room, all three dining rooms are served by a common kitchen and cafeteria without cross circulation. The long cafeteria counter is divided into three sections, one for each dining room. Girls from each dormitory proceed as a group along their own cafeteria lines to their respective dining rooms at breakfast and lunch. For dinner at night they enter directly into the dining rooms.

The basic planning difficulty encountered in the development of this scheme was the interference of kitchen service to the dining rooms by the passage of undergraduates to and from the dormitories. This



Glass walls of the three spacious dining rooms face directly south. Additional daylight is supplied at the rear by a row of clear plastic bubbles set in the roof, each five feet in diameter.

Cosmas V. Cosmades



Details of the common dining rooms and kitchen of the new Wellesley dormitories. There is a central dishwashing room and all sections are equipped with the latest devices for the storage, preparation and serving of food.



This double bedroom, like the others, has built-in bureau and mirror. Walls are painted cinder blocks. The birch desks used were especially designed.



Fireplace alcove in the Freeman quiet room just off the living room. Flooring is of cork tile which is uncovered except for the fireplace area.



Handy wall ironing boards are available in the floor lounges. Nearby is a kitchenette where girls may prepare between-meal snacks.

cross traffic was avoided by placing the kitchen on the ground floor with dormitory entrances on the above level, taking advantage of the sloping site. Thus students have free access to their quarters from the courtyard and colonnade on the upper level, while the service entrance to the kitchen and connections between it and the dining rooms are uninterrupted.

Basic Building Dimensions

Each dormitory is unusually narrow and tall, being 32 feet wide and five stories high with a penthouse as a sixth story. The combination of height and narrowness accounts for the slender proportions which characterize the exterior appearance of the dormitory group. This slim appearance developed from the desire of the college to have more single than double rooms. Five single rooms are located in the sixth floor penthouse and are grouped around the elevator shaft. Each of the four typical bedroom floors has eleven double and eleven single rooms.

Instead of a building width of three bays with structural columns on either side of the corridor, the architects eliminated an entire row of columns, resulting in a building two bays in width. The double rooms occupy one bay and the shallower single rooms and the corridor occupy the other. All bedrooms enjoy ample daylight since the long dimension parallels the exterior wall and its horizontal windows.

Before establishing the final design sample bedrooms were built, criticized by faculty members and students, and modified accordingly. This resulted in rooms of ample size with large closets and built-in bureaus and mirrors. Every room has a natural wood slatted shade that rolls down over the window. A continuous bookshelf over the window conceals the heating pipes above and forms a recess for the shade and curtains below.

Service Facilities

A large utility room located in the midpoint of each floor is the housekeeping center and includes a cleaning sink, generous shelving for the storage of housekeeping articles and an incinerator chute for the disposal of rubbish. The well-ventilated entrance passage to the wash rooms is lined with racks for towels and toilet articles. This confines all dampness to one area. The girls wash their hair in a special basin with shampoo spray, located in the central wash room, after which they may adjourn to the floor lounge where the hair dryer plugs are located. These floor lounges are unquestionably becoming the focal points of social life on the floor.

Distribution of laundry and linen is simplified by a central linen room in the basement. Another convenience is the basement trunk room, equipped with specially designed shelves which allow the girls to open their trunks at any time. Storage space for suitcases is provided in the bedroom closets.

Layout of Ground Floor

On the ground floor of each building the architects have provided a living room with fireplace, and beyond that a quiet room with books and fireplace for use as a library or study room. Each living room opens onto an outside terrace. Also on the ground floor are located five seminar rooms providing space for small classes and meetings.

The busiest area of each dormitory is the entrance lobby with its control desk, mailboxes, bulletin boards, stairs and elevator entrance. Coat alcoves are



Sculptor John Rood and Mrs. Rood presented sculpture, a bluestone terrace and two Alabama limestone benches to Wellesley College. Mr. and Mrs. Rood spent six weeks at Wellesley while the sculptor worked on his presentations—a figure of Persephone, daughter of Demeter, Goddess of the Harvest, and the Demeter Wall. Mr. Rood's conception of Persephone reveals her figure in the space within carved stone, as shown above. The leaves at the bottom add to the resemblance of the figure to a giant opening bud. The carvings of animal and vegetable forms on the figure express the riot of growth in the spring, and are symbols of the power of Persephone, Goddess of Spring.

located nearby in the corridor leading to the dining rooms. The new kitchen and cafeteria for Bates and Freeman dormitories are models of efficiency and are equipped with all the latest devices for the storage, preparation and serving of food. There is also a central dishwashing room.

The glass walls of the three spacious dining rooms face directly south. Additional daylight is supplied at the rear by a row of clear plastic roof bubbles, five feet in diameter. Two of the dining rooms can, on occasion, be thrown together by opening a folding partition to create a large hall, 45 feet by 90 feet.

With all undergraduates living on campus for the first time in 66 years, 1952 has been a milestone in the history of Wellesley College, and the new dormitories are a monument to the progressive spirit of the college and to the generosity of its alumnae.

Olive Sawyer



This covered walk connects the entrance level of Freeman Hall in the background with Bates Hall, appearing in the foreground.



FACULTY-DESIGNED SCHOOL OF ARCHITECTURE BUILDING, GEORGIA INSTITUTE OF TECHNOLOGY



by BLAKE R. VAN LEER

President, Georgia Institute of Technology, Atlanta

Dr. Van Leer received his B.S. degree from Purdue University, his M.S. from the University of California and doctorate degrees from Washington and Jefferson College and Purdue University. He has been president of Georgia Institute of Technology since 1944. Dr. Van Leer served as a lieutenant in the first war and as a colonel in World War II.

PRIOR to 1952 the School of Architecture at the Georgia Institute of Technology was treated pretty much as many schools of architecture in other institutions are treated in that it was housed in nine different buildings, using attics, third and fourth floors, and several wooden temporary buildings. Architecture at Georgia Tech is founded upon the sciences and mathematics and it is taught in an engineering environment. Thus, it is very fitting that the Georgia Tech School of Architecture be housed in a modern, functional type of home. The new structure brings all architectural teaching activities together in one fine building.

The Building Site

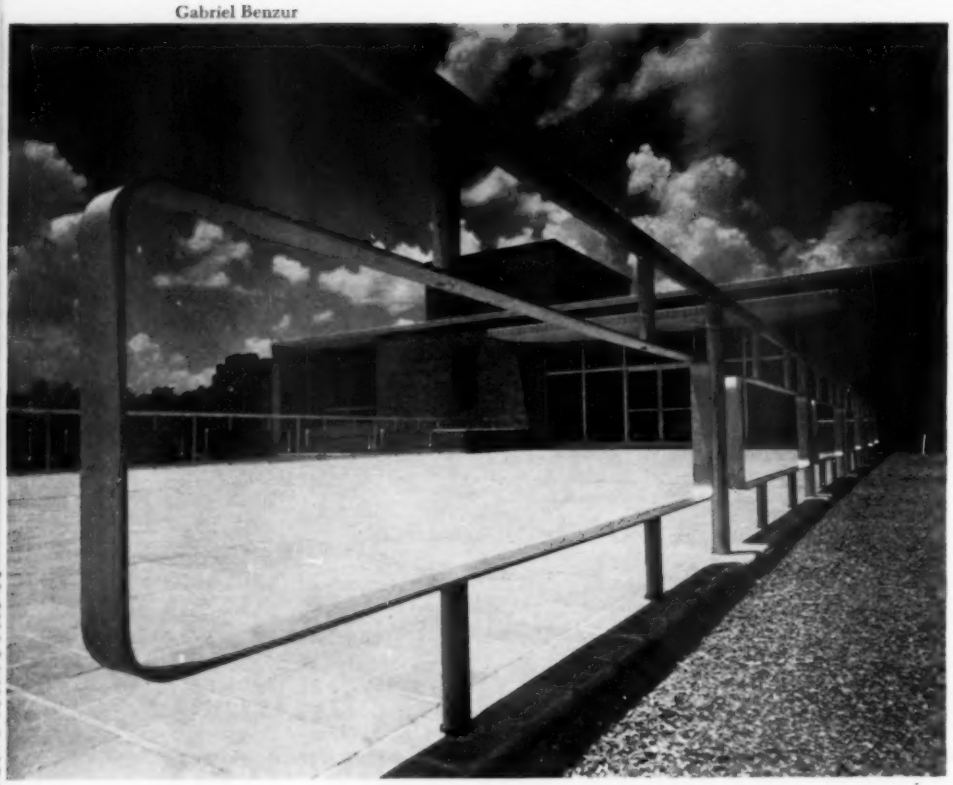
The site of this building is on the northern end of the Georgia Tech campus on what was once known as Fourth Street. The site was selected by the architects because a sweeping view of the building is had from the west and south, and from the building itself a fine vista of other buildings, yet to rise, will be afforded. It has accessibility by automobile from the north and south.

The only disadvantage of the site location was the matter of foundation. A large storm sewer lies under the building and presented a problem of pile and extra foundation precautions. This problem was apparently solved adequately, because after a year's use the building shows no signs of settling or any adjustment cracks of any kind.

The Architects Involved

The building is unique in that it was designed by those who have to use it and live and work in it. The senior members of the architecture school faculty, banded together under the professional firm name of Bush-Brown, Gailey and Heffernan, were the architects.

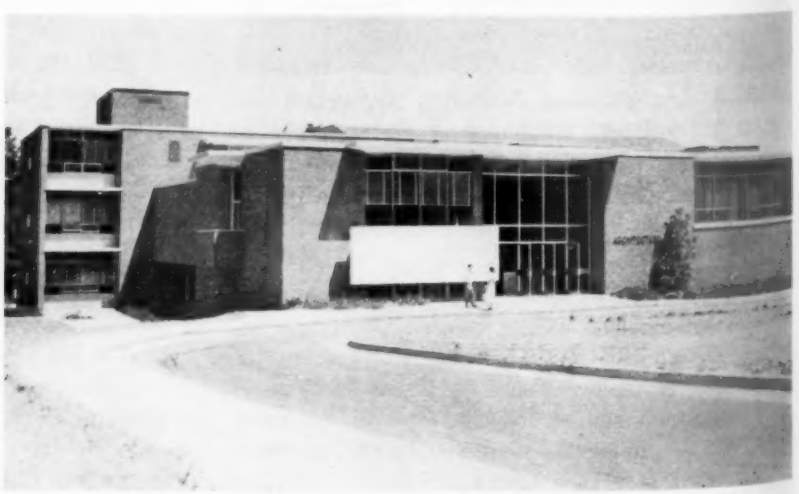
Gabriel Benzur



Roof deck of the Architecture Building, looking toward the north wing. Senior members of the school faculty banded together under the professional name of Bush-Brown, Gailey and Heffernan to design the building.



The open roof deck over the library, and the open concourse beneath the library, together with adjoining garden areas, are adaptable for free-hand sketching by students.



Main entrance to the building is flanked by a white marble panel which is to be sculptured.

These gentlemen had practiced and taught architecture at Georgia Tech for a great many years and were personally familiar with the problems of architectural instruction at Georgia Tech. The principal members of this firm are:

Name	Years at Tech	Years of Experience
Harold Bush-Brown	31	35
J. H. Gailey	41	41
Paul M. Heffernan	16	20
R. J. Snelling	8½	29
Julian C. Jett	5	25
Other faculty members associated with the project were:		
James Pollard	6	24
Sam T. Hurst	4	7
Regis Harrington	2	5
L. R. Tindal	2	18
Ralph Randall	3	4

Staff committee on color scheme: P. M. Heffernan, Chairman, J. H. Grady, D. J. Edwards.

Staff committee on landscaping: George Ramey, Chairman, P. M. Heffernan, Tom Godfrey, Harold Cooledge.

Consultant: Hubert Owens, Head, Landscape Architecture Department, University of Georgia.

Design and selection of furniture: Sam T. Hurst.

Requisitions: furniture and equipment: J. Herbert Gailey.

The Design Problem

The problem in the design of this structure was to produce a building in which could be carried on the study of architecture on the undergraduate level as well as four new programs in city planning, industrial design, graduate architecture and architectural research. Because Georgia Tech is located in Atlanta, Georgia, the rapidly expanding cultural and industrial center of the south, such work can be done successfully in a delightful environment. The student's experience can be made real by practical experience and by participation in a variety of community services in live projects.

The importance of this can be better appreciated by reviewing the convictions upon which architecture instruction is founded at Georgia Tech.

". . . architecture must be the physical expression of the most advanced capabilities of contemporary culture. The architect, planner and designer must assume leadership in organizing our environment with human understanding, recognizing that technology, science and art are all elements of the designing process. To master the professional process of organization of resources, use of techniques and objective interpretation of personal desires, the student graduating in architecture should attain these qualifications:

"1. A basic knowledge and appreciation of the physical and applied sciences.
2. A critical and analytical comprehension of our cultural past and present.
3. An expanded and sensitized response to the physical world.
4. An understanding of human needs, motives and aspirations.
5. The ability to evaluate and control the elements of sensory impression.
6. The ability to apply in the design process research, analysis and synthesis with logic and a sense of relative values.
7. An interest in allied fields and an understanding of the essential unity of all creative activity.
8. An appreciation of the administrative, financial and legal aspects of professional practice.
9. Facility in all aspects of presentation of design ideas.
10. Proficiency in the realization of design ideas in terms of construction techniques.
11. A consciously evolving personal philosophy of creative action."

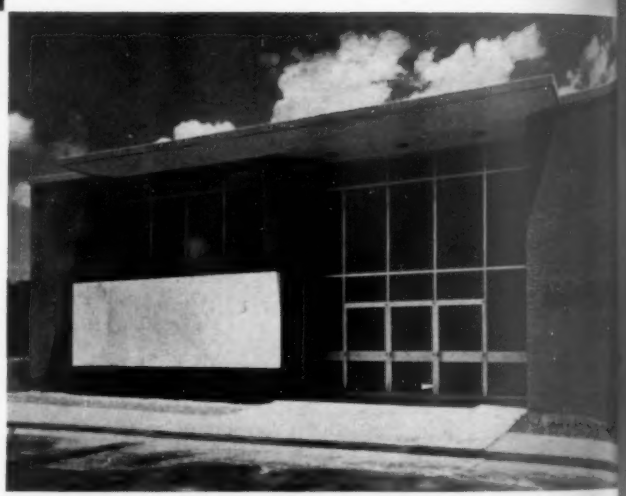
Garden and open concourse of the new building are functional as well as aesthetic, being used for research in the use of building materials exposed to the weather.



Gabriel Benzur



This entranceway leads into the auditorium lobby of the building. The auditorium is partly below ground, is air-conditioned and has no windows.



South main entrance. The entire building is designed on three ground levels.

School Has Expanded

From its beginning in 1908 the school has expanded its offerings to meet the needs of a profession undergoing great change and a building industry second only to farming in the nation's economy. In addition to its primary program of preparation for architectural practice, the school now offers three optional programs at the undergraduate level. In 1934 the Structural Option was established for training of architects with special emphasis on structures, fulfilling a great need for "architectural engineers."

Just prior to World War II an Industrial Design Option was established. Discontinued during the war years, this is now fully reestablished as a part of the expansion program. Following World War II the Light Construction Industry Option was added. This program prepares builders and materials merchandisers to function more effectively with architects. About 25 percent of the school's present enrollment enters this option.

It has been the steady conviction of the faculty that men entering these related fields, coming from the common experience of two or more years of identical training before specialization, could perform with full understanding for each other.

With the completion of the new building the school launched, in the fall of 1952, a two-year graduate program in City Planning under the direction of Regents' Professor Howard Menhinick, and a four-year undergraduate program in Industrial Design headed by Associate Professor Hin Bredendieck.

Three Ground Levels

The Georgia Tech Architecture Building is a functional building designed on three ground levels. The four-and-one-half-story teaching portion is on the north side and includes drafting rooms, classrooms, offices and a shop. The two-story south wing includes an auditorium, exhibition and judgment room, the office of the director of the school and the staff room. The north and south wings are joined and connected, together with an open concourse, by the library and gallery. Between the north and south wings and on the intermediate level of the concourse is a garden.

The building has an abundance of space on three

Lane Bros.



Seminar room in the Architecture Building.

sides which insures not only sufficient air and light, but avoids the overcrowding which was so characteristic of older parts of the campus.

Since 1944 there has been a plan or policy to build into each of the new special-purpose buildings an auditorium capable of seating the entire number of students enrolled in that particular school. This condition is met by having an auditorium in the south wing which will seat 300.

The site made it necessary to deal with changes in levels. This fact provided the unusual opportunity to develop interesting spaces and constantly changing outlooks throughout the building. The spaces, areas and forms developed are not entirely a matter of aesthetics but are arranged to serve useful purposes. The open tile deck over the library, the covered open air concourse under the library, and the adjoining garden areas within the enclosed wings are all adaptable for free-hand sketching by students and can also be used for demonstrations and research in the use of building materials exposed to the weather.



The library has no windows and thereby has more shelf area along all the walls.

The building itself is most complete for its purposes. It is constructed of materials which will last an indefinite period and which can be easily and economically maintained. While no legitimate expense has been spared, there has been no unnecessary use of materials or superfluous insertions of obsolete architectural forms.

Professor Bush-Brown, director of the School of Architecture, in his notes prepared for the dedication of the building on September 20, 1952, had this to say:

"No building conceived and built with this approach and in an institute of technology could be anything but modern. The construction is reinforced concrete, the walls of brick and windows are enframed with aluminum. Except for the gallery, the long lines of windows face north and south. This is to obtain maximum daylight and at the same time provide sun protection against excessive heat from morning and afternoon slanting rays. The projecting canopies over the windows at floor level serve a double purpose: sun and rain control; and a means of window cleaning from the outside.

"This building had to be put on piles over an old sewer; the sewer was re-built, and a great deal of excavating and grading was involved. Also adding to the cost are the air-conditioned library, auditorium, lecture room and staff room. The auditorium is partly below ground and has no windows, as windows are not needed or even desirable in a properly ventilated auditorium.

Borrowed Light for Library

"The library also has no windows but has borrowed light. Eliminating of windows gives more shelf area along the walls, and the air conditioning preserves the books. Needless to say, this room is a comfortable place in which to study and has already proved to be especially popular in the heat of summer. The lecture room may be darkened for illustrated lectures which constitute an important part of architectural education, and this room is therefore air-conditioned. The drafting rooms are not air-conditioned but do have through ventilation.

"There are three other items of more than minimum cost which may be noted. The new Georgia Fire Code makes mandatory expensive fire enclosed stairs. The lighting of such a building as this, where the major subject of study consists of long hours in the drafting rooms and a great deal of night work, makes it important to provide adequate artificial lighting. Finally, the architects felt it necessary to treat the ceilings of



Above is the architects' view of the building before construction was completed. At right is building as it now stands. Note the roof deck, elevator penthouse and raised roof to accommodate the mezzanine level.



most of the working spaces with an acoustical tile to cut down the noise.

"The two items which could have been regarded as an extravagance in the original design, sculpture on either side of the main entrance and an elevator, were eliminated from the contract after bids came in. Considering the nature and purpose of the building, it could be argued that these features were not an extravagance but, in the interest of economy, they were omitted.

"The building was designed for an architectural school of about 300 students. However, it is sufficiently flexible to accommodate a certain amount of fluctuation above and below the hypothetical enrollment figures adopted for the purpose of planning.

"In fact, the flexibility of the building has already been tested by a change and expansion in programming brought about by a substantial grant from the General Education Board, awarded to the School of Architecture for a six-year period. This grant was made because a fine new building was being provided, because of the school's potentialities for increased service, and because the Board of Regents was willing to do its part in the proposed expansion plan. This program included city planning and industrial design. Industrial design had already been anticipated by designating a shop on the ground floor level in the north wing. This is being used as an industrial design laboratory at the present time. City planning is being taken care of without too much difficulty.

"The School of Architecture now gives State Board examinations for the registration of architects. The building is admirably adapted to the performance of such service, and the faculty are happy to be in a position to serve the state in this or in other similar ways.

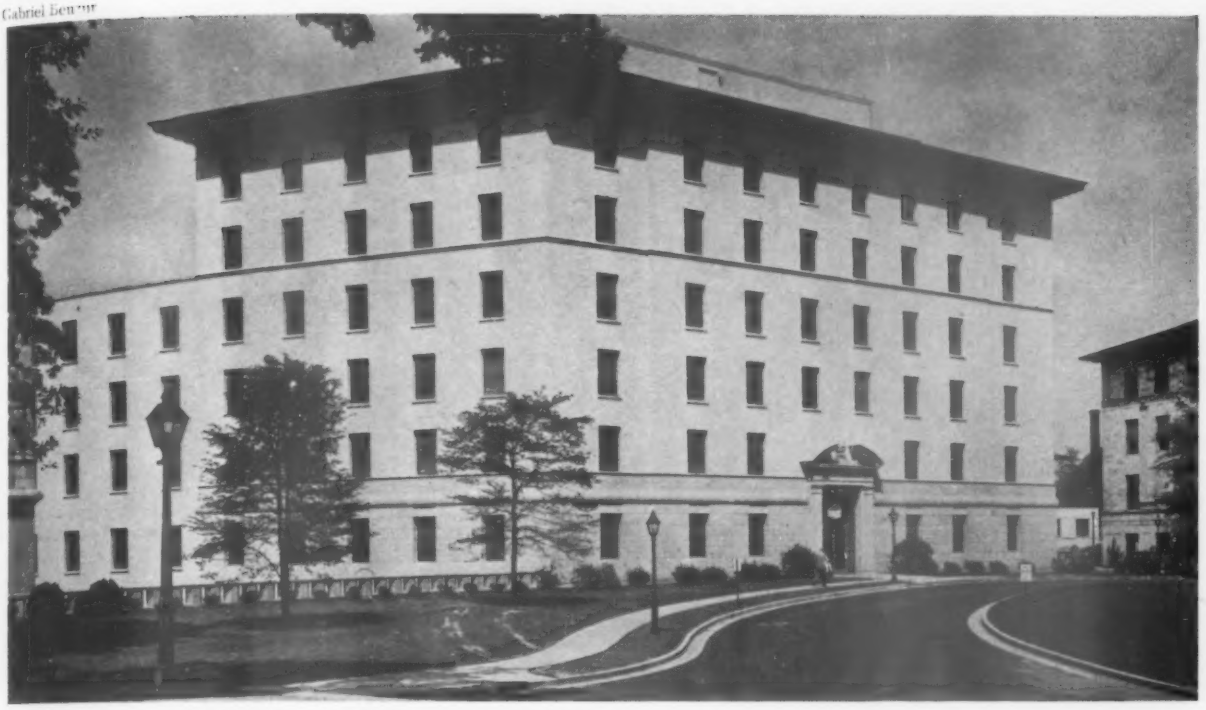
"In fact, the architecture building is intended to serve more than just the needs of the School of Architecture. The auditorium is available, when not in use, for departmental affairs or for any demands on the part of other departments on the campus. It is adaptable for use in conducting large lecture courses, for orientation group meetings of freshmen and for examinations. We are making use of this room for evening lectures of a cultural nature which serve the Atlanta community as a whole. We are equipped to give talks illustrated by slides and motion pictures.

"The exhibition room above the auditorium will be used for a series of traveling shows, all of which will be not only for the benefit of our own students, but will be open to all students and teachers at Georgia Tech and to the general public."

Conclusions

The new School of Architecture building at Georgia Institute of Technology is an excellent and outstanding solution of the problems of housing the school. The building most adequately meets the academic and institutional needs of a large professional school in architecture which is alert, creative, modern and progressive in one of the oldest fields of professional service devoted to making man's environment beautiful, useful, convenient and most conducive to productive and rewarding efforts.

Gabriel Benoit



Woodruff Memorial Building for medical research at Emory University, Georgia. Robert and Company, Associates were the architects and engineers.

MEDICAL RESEARCH BUILDING, EMORY UNIVERSITY

by NELL M. IRVIN

News Writer, Office of Public Information, Emory University, Georgia

Nell M. Irvin attended Shorter College, Rome, Georgia, and received an A.B. in English Literature in 1949. Her experience has included positions as continuity writer for radio, staff writer for the Rome, Georgia, *News-Tribune*, director of publicity for Shorter College, 1951–52, and instructor in English at Shorter College.

COMPLETION of the new Woodruff Memorial medical research building in 1952 made available a much-needed modern laboratory, classroom and administrative office building on the campus of Emory University in Atlanta, Georgia.

Expansion of medical facilities at Emory in recent years has been directed towards the development of a great medical center comparable to those built around the nation's great universities. The Woodruff building is the most recent addition to the center, composed of the University Hospital, the Robert Winship Clinic for the study of benign and malignant neoplastic diseases, the Conkey Pate Whitehead Surgical Pavilion, Crawford Long and Grady hospitals, and other hospitals and clinics. The building is already taking its place in these plans of expanded medical service to the region by affording a central and convenient location for regional research in medicine.

Built at a cost of over $2,000,000, the modern, eight-story building was designed by Robert and Company Associates, architects and engineers, and constructed by the Barge-Thompson Company, both Atlanta firms. Funds for the building were granted Emory by the Emily and Ernest Woodruff Foundation and the National Cancer Institute.

Memorial to a Philanthropist

Conceived of as a memorial to the late Ernest Woodruff, outstanding Southern businessman and philanthropist, this building "Dedicated to the Advance-



Abner W. Calhoun M... morial Library is located ... the third floor of the me... cal research building. T... is the impressive ar... periodicals section of t... library.



Joseph T. Jackson

Cubicle in the stacks of the Calhoun Library where students may work privately.

ment of Medical Science through Research" was planned to serve as well for administrative offices, classroom and library areas for the Emory University School of Medicine. It was formally dedicated in November and December, 1952, when a series of five medical lectures for the layman—in keeping with Emory's idea of greater service to the community—were given. The structure had been two years in the building.

The prerequisites of efficiency and economy, attractiveness and harmony with other buildings on the Emory campus were taken into consideration in the design and construction features of the Woodruff building.

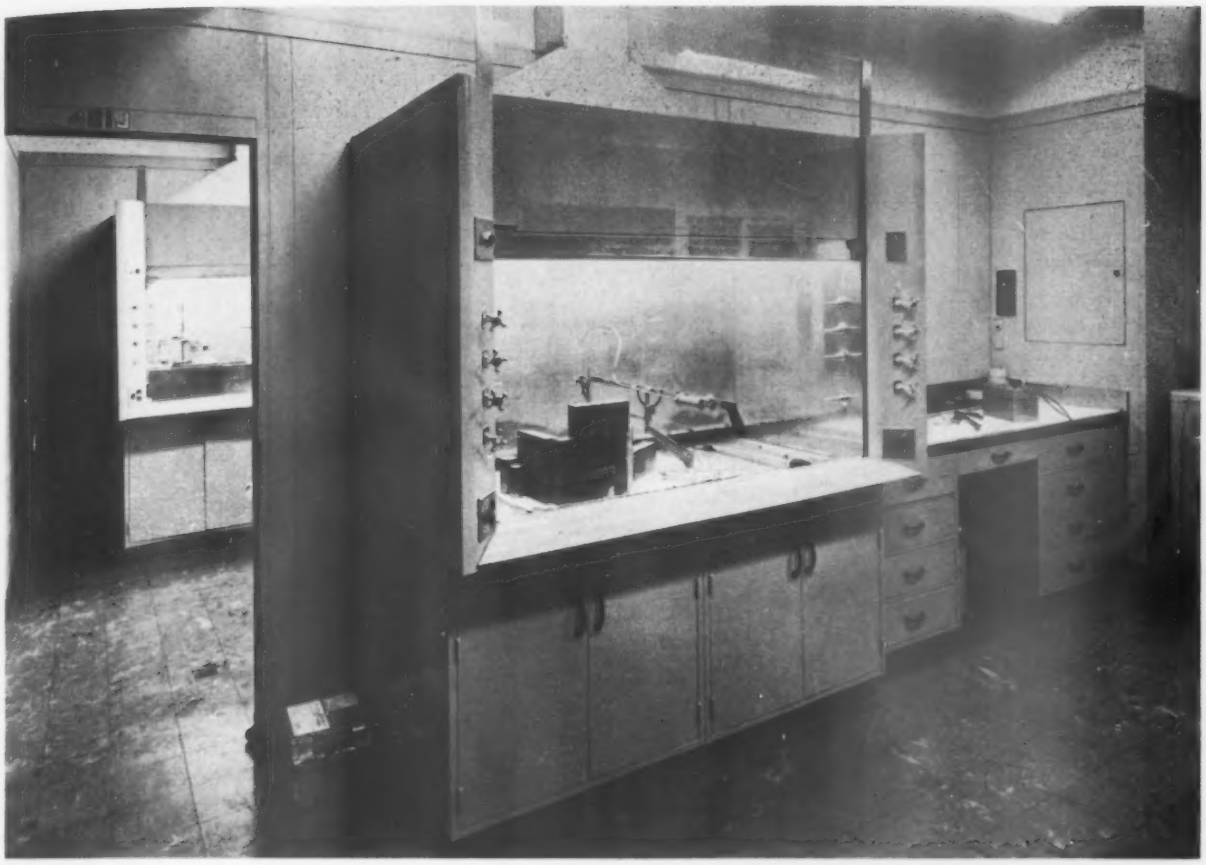
The framework is of reinforced concrete. The outside walls are of brick with stucco applied. Inside the brick wall is an insulation of foam glass.

Stucco and Red Tile Exterior

Stucco was selected for the outside of the building because of its neatness, comparative economy and accord with the exterior of its next-door neighbor, the Emory University Hospital. The roof is of red tile to match the roofs of typical Emory buildings. A light aqua color was used as a trim for doors of exits, grill work over window wells and outside railings.

The walls of the entrance lobby on floor two are of pink imported marble. Just inside the doorway to the right is the chiseled, gold leaf inscription, "Lighten Our Darkness, We Beseech Thee, O Lord," with the name and life dates of the philanthropist for whom the building is named. Terrazzo floors extend to the asphalt tile of corridors to each side. The sculptured relief above the front entrance is of cast aluminum, pinned out from a black granite panel. The theme of the relief by sculptor Julian Harris of Atlanta is "The Purpose of Medical Research is the Health and Happiness of the Family."

Throughout the building permanently coated and washable grey steel movable walls, insulated inside to

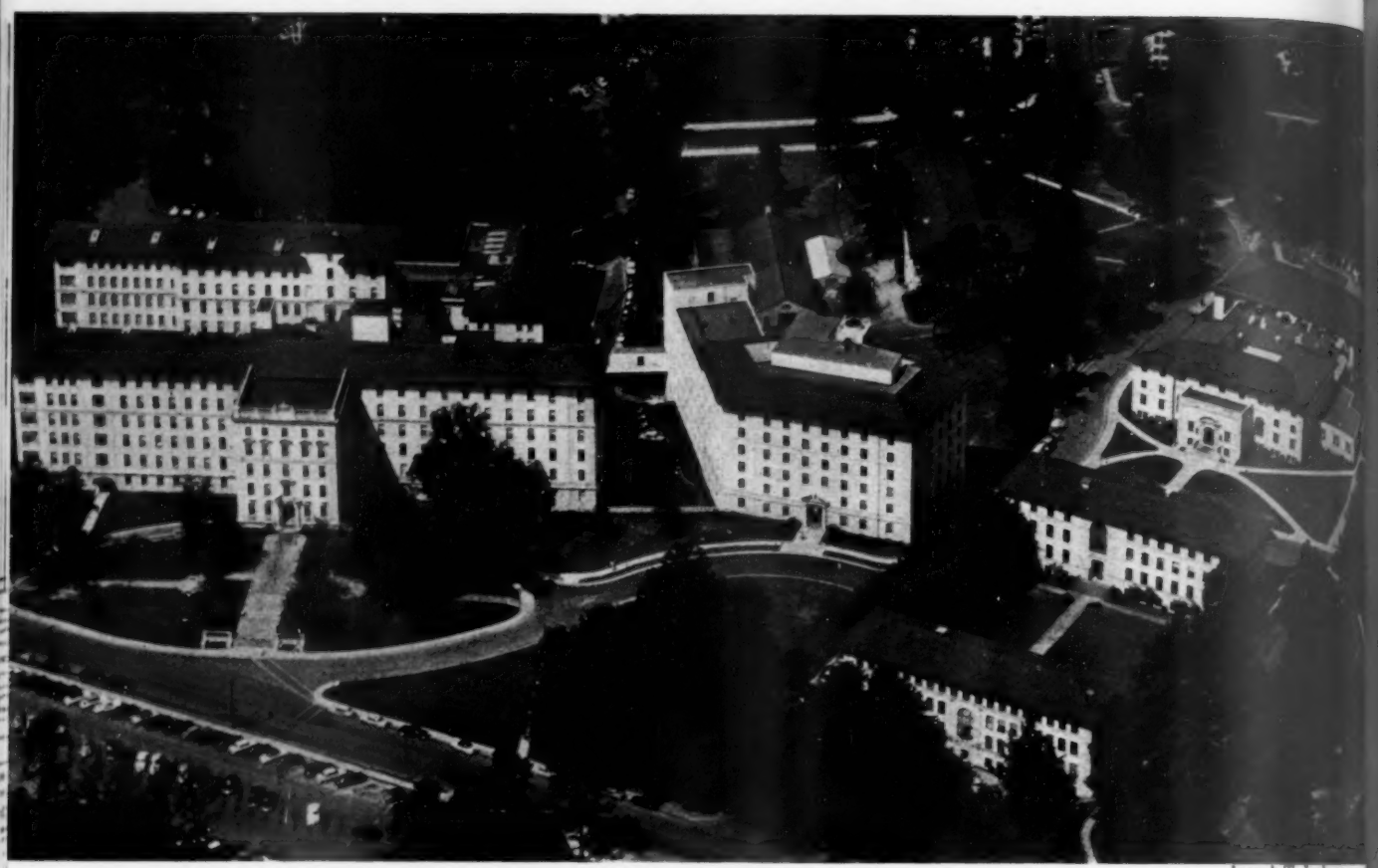


Radioactive fume hood and remote control equipment for the handling of radioactive isotopes used in the treatment and study of patients. Lead bricks placed in front of the experiment being carried on give localized protection against radiation.

This is a typical spotless laboratory in the Woodruff Memorial Medical Research Building. The latest in laboratory equipment is provided for the highly specialized work conducted here.



Gabriel Benzur



Joseph T. Jackson

Aerial view of a portion of the campus of Emory University. To the left is the Emory University Hospital with its clinics and pavilions; to the right foreground are the Physiology and Anatomy Laboratories of the Emory School of Medicine. Woodruff Memorial is in the center. Other buildings are part of the College of Arts and Sciences of the University.

deaden sound, have been used with the exception of the glazed structural tile walls to be found on the ground floor of the building, and walls around such permanent installations as elevator shafts, duct spaces, restrooms and stairways.

Advantages of Movable Walls

The many advantages of movable walls were taken into account before they were finally selected. Since the building is largely designed for research purposes, the laboratories, operating, sterilizing, cleaning and dressing rooms associated with such activity can be increased or decreased in size comparatively quickly and at little cost. Most important of all, individual laboratories can be expanded or diminished in size as the requirements for space in each experiment so warrant. Changing of office spaces to meet changing needs is also possible.

Service strips for laboratories have been used throughout. Utilities available from the outside walls at each 12-foot module include hot and cold water, gas, steam, air and suction as well as a drain. Faucets and jets—each with a characteristic color—for various utilities average four complete units per laboratory. Some cabinet work for the building was contracted for by the Emory University Shop, while major laboratory installations were contracted for by Kewaunee Equipment Company of Adrian, Michigan.

Utility lines run horizontally rather than vertically inside the outside wall, making possible more frequent and cheaper tapping of utility lines, with approximately five vertical connections with central utility pipings per floor. Lines may be serviced or tapped by the removal of panels, built for accessibility to them, in the steel walls.

Safety showers in laboratory areas are provided at necessary intervals in the corridors of laboratory areas, and their location is designated by a block of contrasting asphalt tile set in the floors. The showers are connected to utility lines by overhead pipes running to the outside walls but hidden from view by the acoustical ceilings.

Recessed fluorescent lighting is used in corridors and in some sections of the library, while the pendant type is more typical of laboratories and offices where a greater amount of illumination is needed.

Second Floor Facilities

On floor two, the entrance floor of the building, are situated the offices of administrative officials of

the School of Medicine, those of the department of medical illustration and photography, and the offices, observation rooms and laboratories of the department of psychiatry.

One-way glass panels have been installed in the walls of laboratories in the department of psychiatry so that psychiatric treatment, experiments and techniques may be observed by students without the patient's consciousness of the presence of others. Conversations are audible to observers through a system of outside speakers connected with microphones in the laboratories. One of these laboratories, used for electroencephalograms, is copper-lined to insure accuracy of sensitive measurements and is also furnished with a panel of one-way glass, over which a copper wire screen has been placed.

On the ground floor of the Woodruff building are suites for some of the research activities of the departments of pathology and medicine. A large group of animal rooms and central units of utilities are located on this floor.

On floor one, directly under the main floor of the building, are research laboratories and facilities for the study of cancer and the laboratories of the department of biochemistry, as well as conference rooms and classrooms.

Medical Library on Third Floor

The entire third floor of the Woodruff building is given over to the A. W. Calhoun Memorial Library, the main branch of the university's medical library. A few permanent memorial rooms have been built on this floor, but otherwise the spaces of the stacks and current periodical sections are broken only by the structural columns of the building. Since very few permanent wall structures have been set in, the space the library presently occupies can easily be converted into laboratory and office spaces when the library is moved to the new wing of the building planned to house it.

The Whitehead Surgical Laboratory of the department of surgery, the radio isotopes laboratories and workshop, a few animal operating rooms and rooms for examination and treatment of patients occupy the fourth floor of the Woodruff building. The wing to the left of the main building at this level has been left unfinished.

In the radio isotopes laboratories is found special equipment for utilizing isotopes in the treatment of patients and for the study of the results of these treatments, as well as for the actual handling of the isotopes. No special protective lining for walls surrounding this laboratory area was necessary, since localized protection from radiation is furnished by the lead coverings of all vessels containing radioactive substances. Fume hoods are built into each laboratory in this area, over counters where remote control work is done with radioactive materials. These fume hoods provide a high velocity draft flow in a linear direction so that there is no turbulence of backflow. Intake and



Detail of the aluminum cast used over the entrance of the Woodruff Building. To the lower left is seated a physician dressed in laboratory smock and looking into a microscope. To the right is the family group, symbol of medical research. With strength and confidence through health they suggest movement toward the rising sun, symbol of the happy future. Clouds of ignorance roll away as the sunlight of knowledge bursts forth.



Gabriel Benzur

Rear view of Woodruff Memorial Building, Emory University, Atlanta, Georgia.

exhaust blowers for the system are installed on the roof of the main building. Specifications for fume hoods for protection against the inhalation of radioactive fumes have been laid down by the Atomic Energy Commission. Geiger counters have been installed to check the radioactivity of individual experiments and transactions and to tabulate the amount and strength of exposure of personnel to these substances during experimentation.

Air Conditioning of the Plant

Air conditioning for the building is at present furnished by one main unit located in the maintenance room on the ground floor of the building. Space is provided for chilled water pipes of air conditioning units to run horizontally on each floor. When the necessity for an additional central air conditioning unit arises it can be installed in the maintenance room in a space left for that purpose. There is a system of separate cooling, circulating and blowing units for all rooms in which animals are treated or housed, and there is no recirculation of air in this area. Such a system prevents animal malodor from reaching objectionable proportions in the animal section of the building, and at the same time prevents odors from being carried into offices and laboratories of other sections.

Since research activities at Emory are closely coordinated with clinical services of the Winship and Whitehead clinics as well as with the university hospital, a closed walkway between the two buildings was built at the second floor level of the Woodruff building. A balustrade extends from the building's point of junction with its left wing to the right wing of the university hospital, giving a further impression of unity.

Two More Wings Are Planned

At present, three floors of the main part of the building and two floors of the wing have been left unfinished for future development into laboratories and offices when needed. After all available space in the building, as it now stands, has been utilized, overall plans include the construction of two additional wings, one extending from the back of the main building and one to the rear of the left wing.



New home at the University of Kansas for the Departments of Physics, Chemistry and the School of Pharmacy. Building is of reinforced concrete with native stone facing.

SCIENCE BUILDING AT THE UNIVERSITY OF KANSAS

by J. D. STRANATHAN

Chairman, Department of Physics, University of Kansas

Dr. Stranathan has been a member of the faculty at the University of Kansas since 1921 and chairman of the department of physics since 1941. He received his B.S. and M.S. degrees from that university, and his Ph.D. from the University of Chicago. Dr. Stranathan is author of *The Particles of Modern Physics* and of articles in professional journals.

and R. Q. BREWSTER

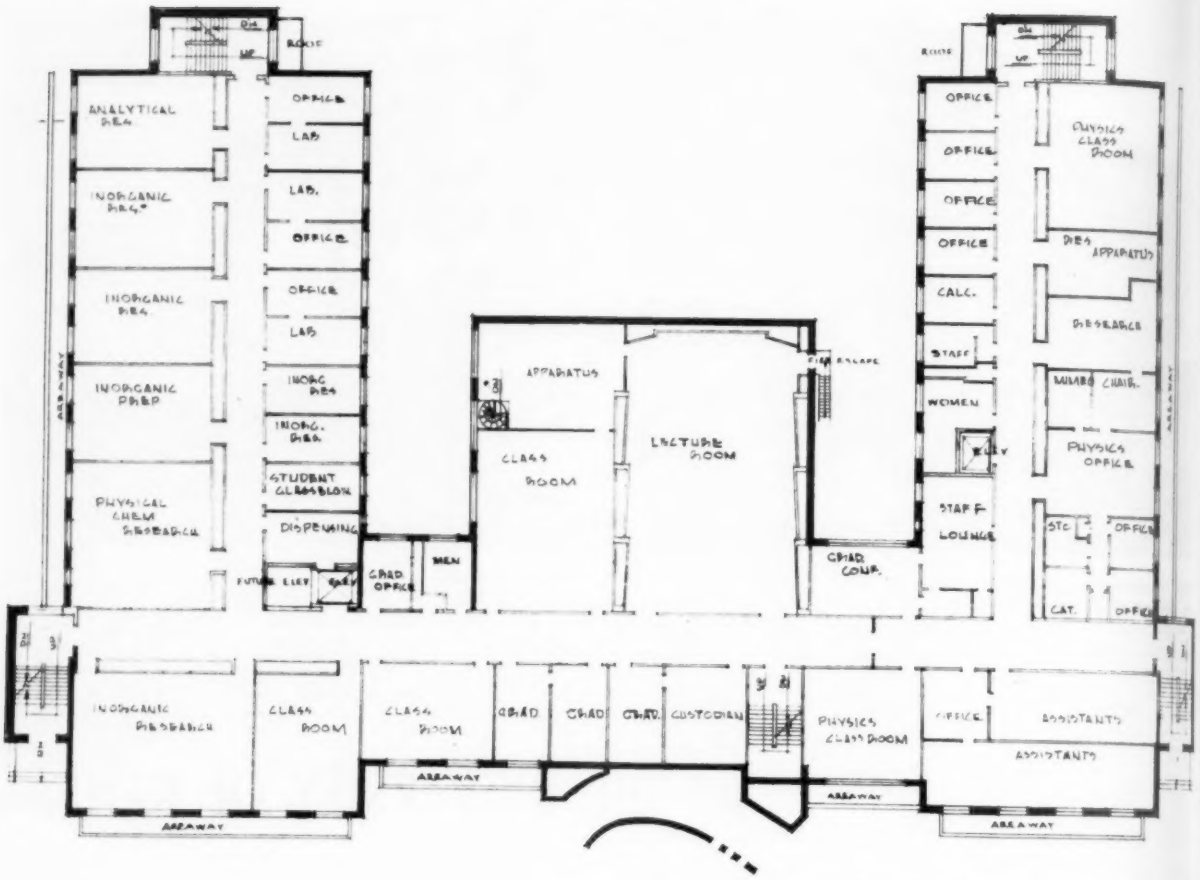
Chairman, Department of Chemistry, University of Kansas

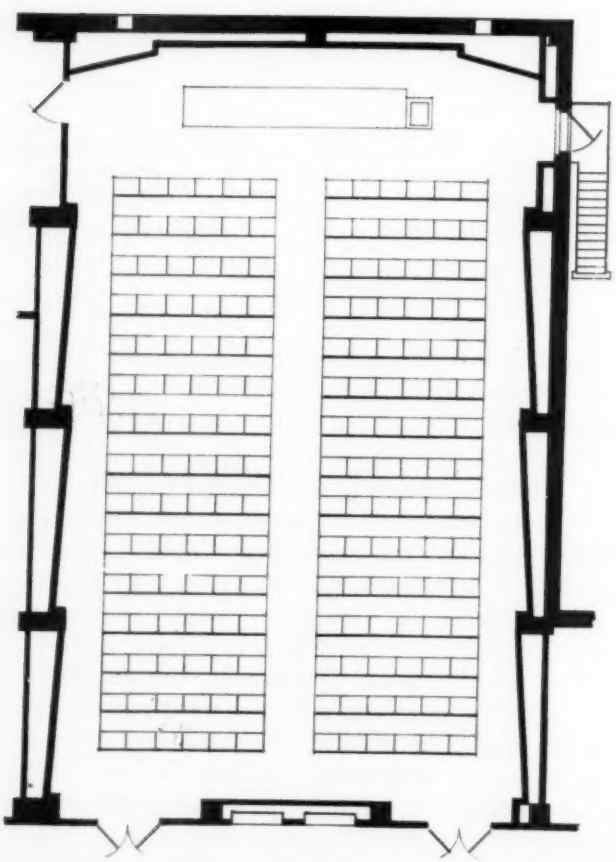
Dr. Brewster received his A.B. degree from Ottawa University, his A.M. from the University of Kansas and his Ph.D. from the University of Chicago. He has taught at the University of Kansas since 1919, has been a professor there since 1927 and has been chairman of the department of chemistry since 1940. Dr. Brewster is author of *Organic Chemistry, A Brief Course in Organic Chemistry*.

IN June, 1954, the Department of Physics, the Department of Chemistry and the School of Pharmacy at the University of Kansas, Lawrence, Kansas, moved into modern laboratories designed specifically for these departments. The new building has been constructed with funds appropriated by the State Legislature, $2,500,000 for the building itself and $800,000 for laboratory furniture, sinks, hoods and other equipment. The E-shaped building is of reinforced concrete construction with native stone facing. The west wing is five stories, the central section seven stories, and the east wing six stories high. Elevators are provided in each wing. The total floor area is 165,000 square feet. The building is located on the south slope of a large hill on which the campus is centered. The slope is sufficient so that, although entrance from the front is on the third floor, full windows are provided even in the basement for all areas except the front fourth of each wing.

Physics Department in West Wing

The Department of Physics occupies the entire west wing and a few rooms in the center section, a total of 50,000 square feet of floor space. Approximately 3,200 square feet in the basement are allotted to nuclear physics research with the department's 2.5 million-volt Van de Graaff generator. The machine itself is located in a large room extending into the hillside in front of the building. The entire nuclear physics section is air-conditioned. Adequate machine shops are provided in the basement of this wing. The department's Collins Helium Cryostat is here too.

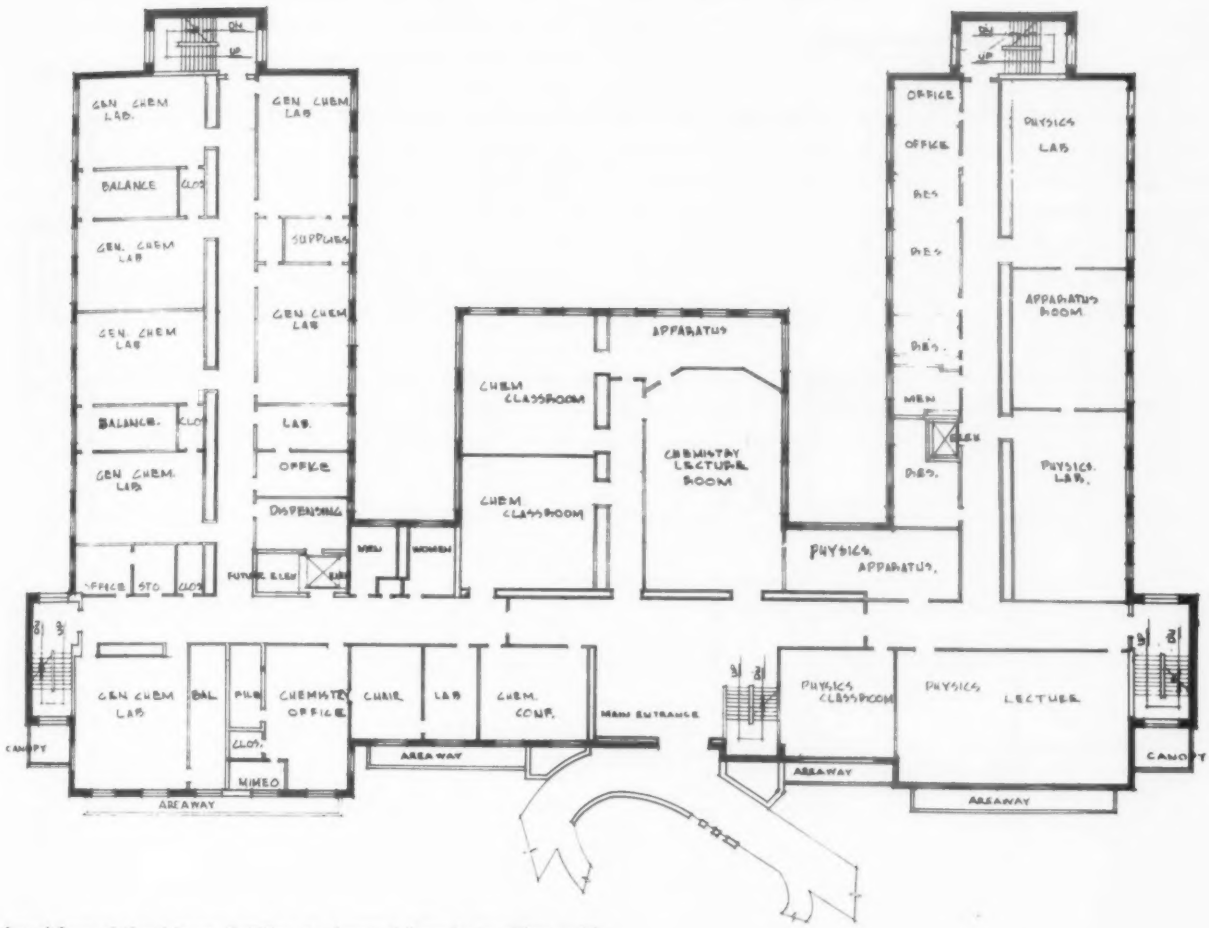




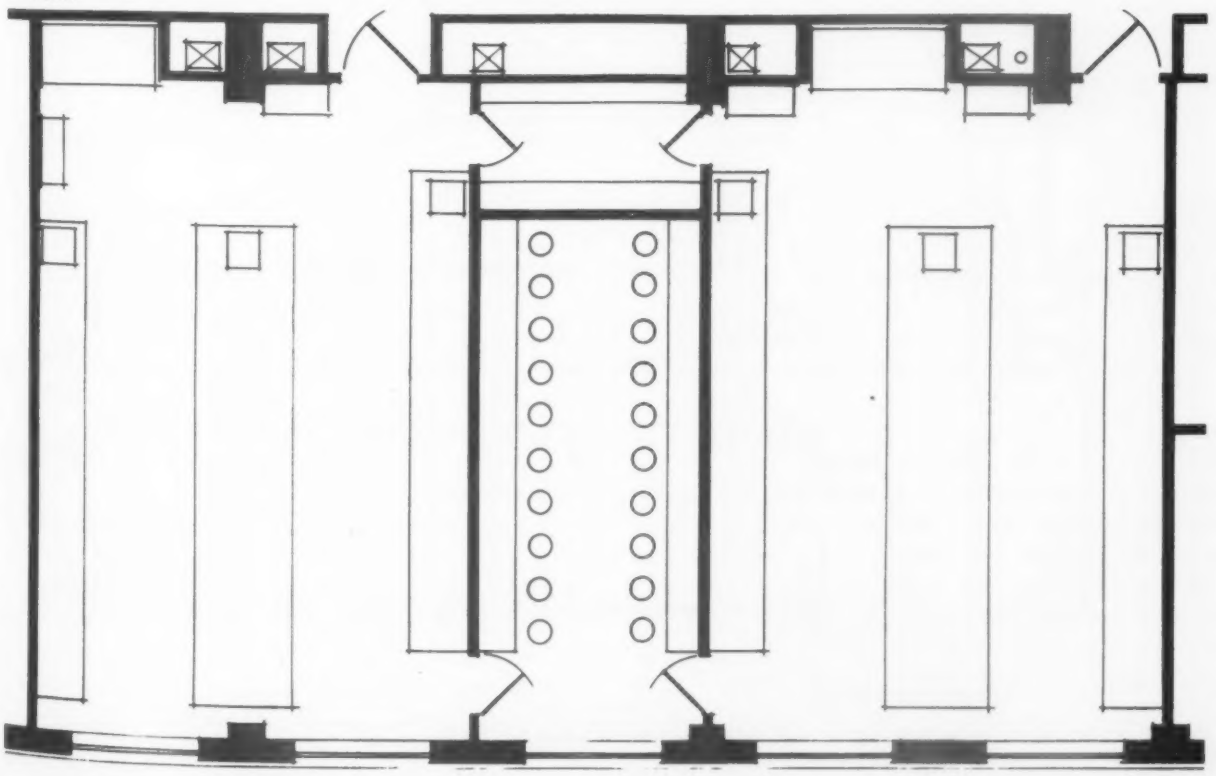
First floor of the new structure contains facilities for the physics and chemistry laboratories. A large lecture room is provided between the two wings. Detail of the lecture room is shown at the left.

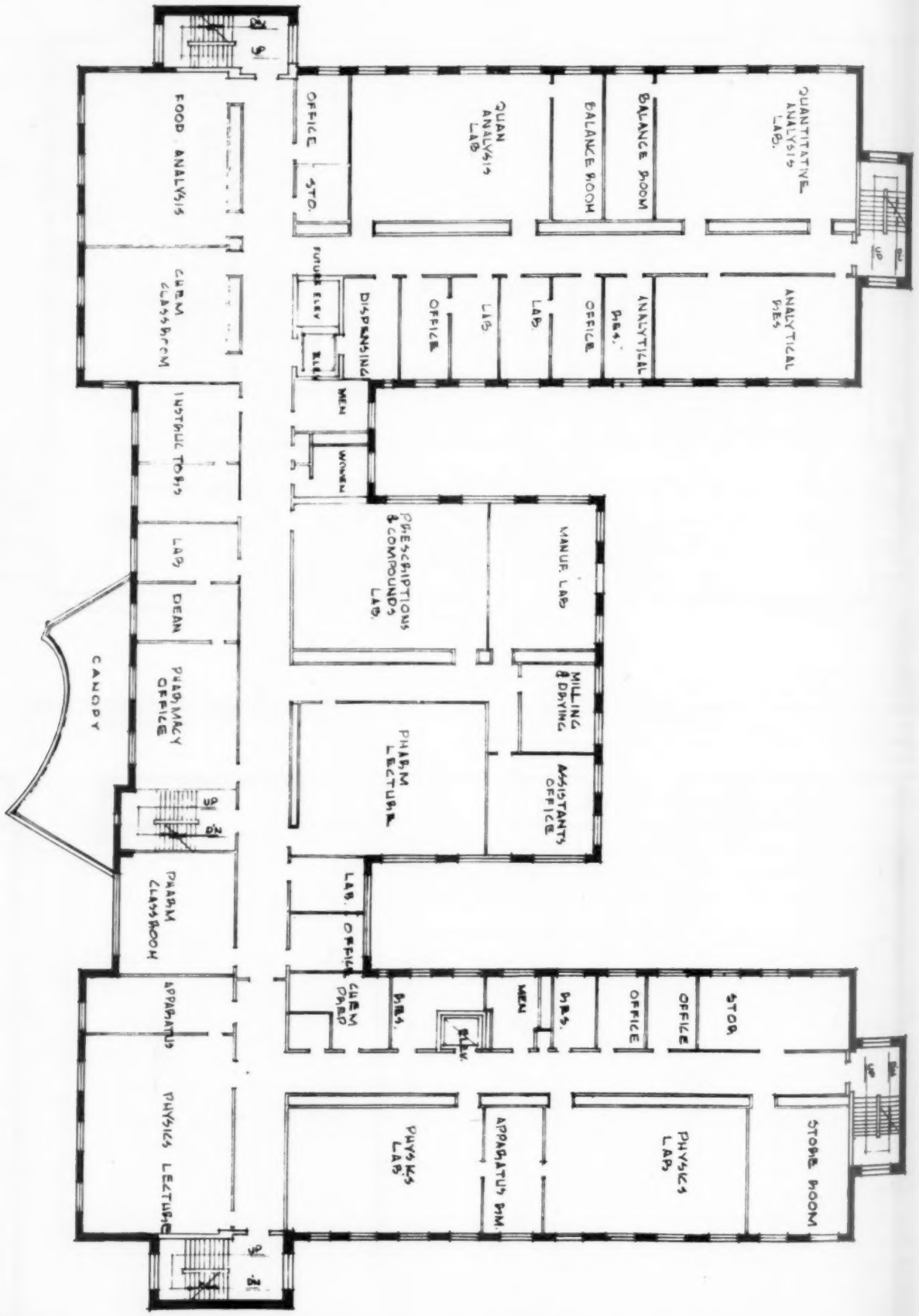
The second floor is devoted largely to offices, although some classrooms and research rooms are included. The third and fourth floors house the general physics lecture rooms and laboratories and additional research rooms and offices. The fifth floor is given over to the advanced laboratories, research rooms and a few offices. Twenty-six rooms are devoted to research in physics.

A number of small general physics laboratories, accommodating from 24 to 36 students each, have been preferred to a few larger laboratories. Individual offices have been provided for all major staff members. Graduate teaching assistants have individual desks in cubicles within two large rooms. A Standard Electric Time Company switchboard distributes electrical power to any research room or laboratory. Three individual 50-ampere lines run to each small research room and six such individual lines to each large research room. A gas-driven unit automatically assumes the electrical load of critical experiments any time there is a failure of the 115-volt, 60-cycle supply. Some of the research rooms in addition to those for nuclear physics are air-conditioned.



Second floor of the Science Building is devoted largely to offices with some classrooms and research rooms included. Plan below shows two general chemistry laboratories with a balance room and corridor between.

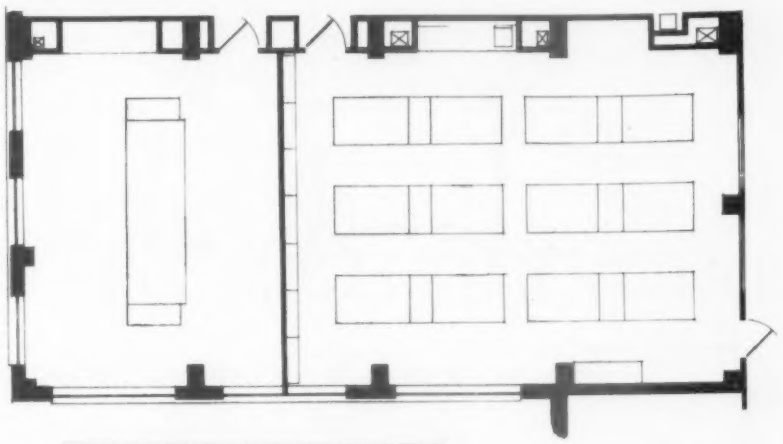




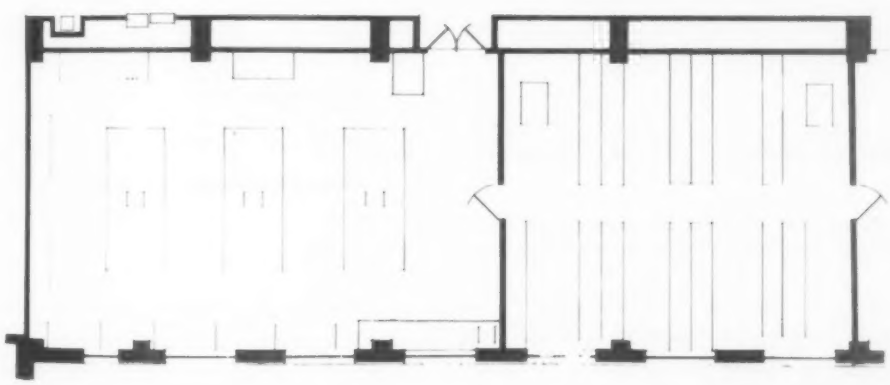
General physics lecture rooms, laboratories and additional research rooms and offices are located on the third floor, the plan of which is shown here. Pharmacy school has space here too.

Chemistry Department Spaces

The Department of Chemistry occupies all six stories in the east wing of the building and three stories of the central section, a total of 85,000 square feet of floor space. In order to facilitate student traffic through the building undergraduate work is conducted on the second, third and fourth floors, whereas the basement, first and fifth floors are reserved for research. Instead of large undergraduate laboratories accommodating a considerable number of students at one time, the rooms are divided into small units. For example, each of the seven freshman laboratories is a complete unit containing 160 lockers with but 20 students and their instructor working at one time. Other classes are subdivided in a similar manner in order to provide good teaching facilities. Each unit laboratory has an adjoining coat closet, balance room or other auxiliary service room as needed. A dispensing room on each level provides materials for all laboratories on that floor.



At the left is a manufacturing laboratory and, at right, the prescription and compounds laboratory of the School of Pharmacy.



General physics laboratory and an apparatus room. A number of small laboratories have been preferred to larger areas.

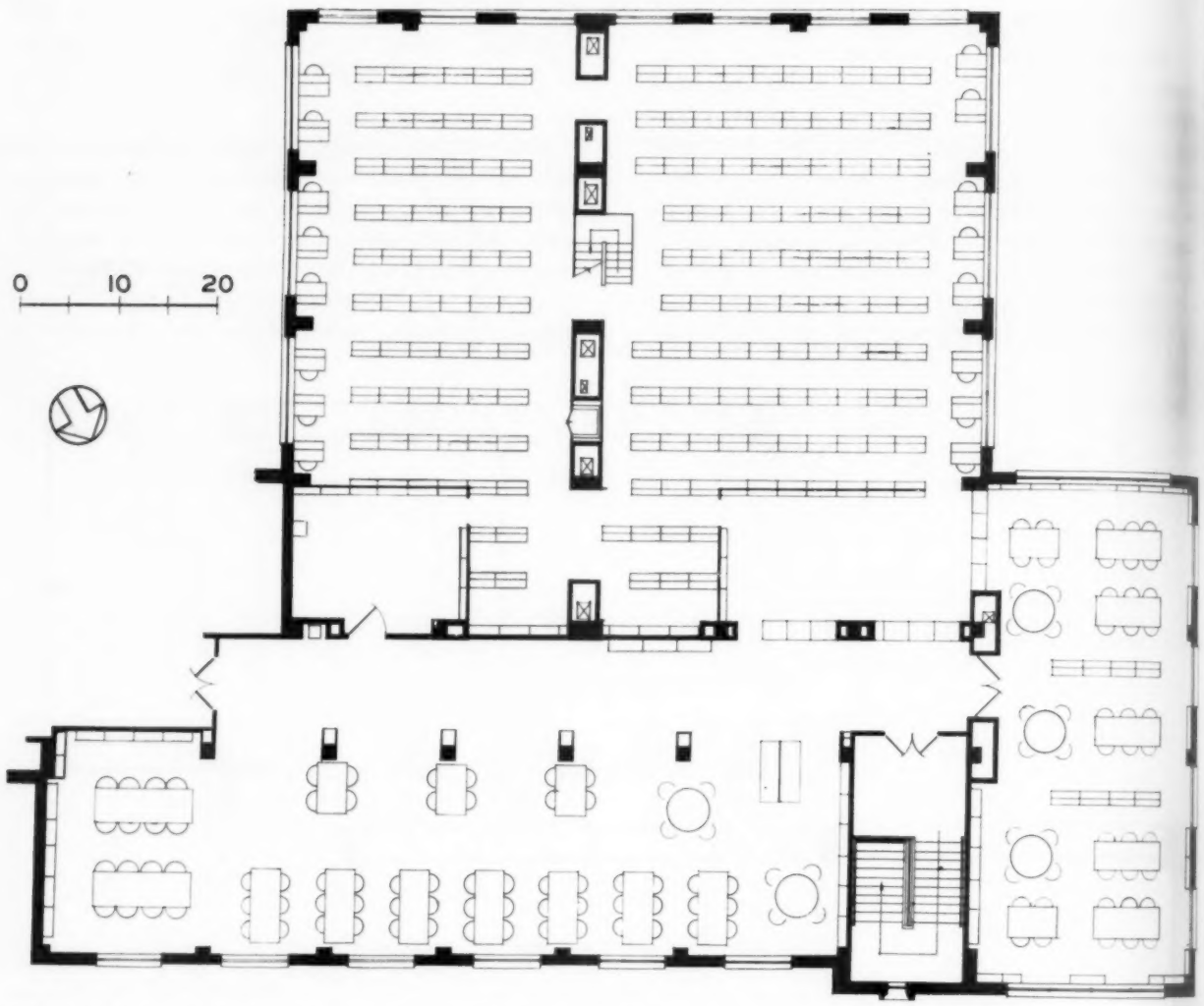
Special Facilities for Research

Research laboratories for inorganic, analytical and physical chemistry are located in the basement and on the first floor; those for organic chemistry are on the fifth floor. Twelve of the research rooms are air-conditioned and most of those in the basement are provided with vibration-free piers. Several individual laboratories are available to students working on special projects, but for the most part graduate students are assigned to rooms accommodating four to six people.

Some of the special facilities for research are laboratories for work with radioactive tracer elements, a spectrographic laboratory with a 22-foot circle for the grating and plateholder, four small constant temperature rooms which may be independently controlled at any desired temperature from +40 degrees to −30 degrees Centigrade, provision for either vertical or horizontal columns of 10 to 75 feet in length, and individual rooms for the infrared spectrophotometer, high pressure apparatus, high temperature induction furnaces and other specialized equipment. Safety features have been provided throughout the building. All laboratories have emergency showers and two or more exits.

Rooms Vary in Size

Major staff members have individual offices with adjoining private laboratories. Graduate students who have not yet begun research are assigned to one of four offices, each of which has eight or ten desks. Classrooms and lecture rooms are available in a variety of sizes, although the largest lecture room is limited to 180 students so that everyone may have a clear view of demonstrations.



Plan above is that of the two-tier library stack room and the student and faculty reading rooms. Library facilities occupy the entire top floor of the central area.

The School of Pharmacy will occupy 22,200 square feet of floor space consisting of the third, fourth and fifth floors in the central section of the building. A large lecture room and a classroom are included. Laboratories are provided for pharmacy, pharmaceutical chemistry, pharmacognosy and pharmacology, with suitable animal quarters for the latter. The central storeroom is on the fourth floor with a pit for volatile solvents in the basement.

A state drug laboratory for analysis of drugs and medicines, an instrumentation laboratory, photographic room, milling room, workshop and a toxicological laboratory are included. One of the special features is the dispensing pharmacy laboratory which has an individual prescription desk for each student.

The administrative offices for the dean consist of a large room and two smaller ones. An office and adjoining private laboratory are provided for each major staff member.

The fourth floor consists for the most part of research laboratories and provides space for approximately 25 graduate and two post-doctorate students.

Common Library Facilities

The entire top floor of the central section, 9,000 square feet, is devoted to library facilities common to the three departments housed in the building. Approximately half of this space is devoted to well-lighted reading rooms. The other half is designed to accommodate a double tier of stacks. The stack room has natural light from three sides. Carrels for the use of staff and advanced students are located along the walls on these three sides. No shortage of library space should be encountered for many years.



Applied Arts Building, Shaver and Shaver, Salina, Kansas, architects.

APPLIED ARTS BUILDING, FORT HAYS KANSAS STATE COLLEGE



by HELEN D. FRANCIS

Director, Information Service, Fort Hays Kansas State College, Hays, Kansas

A graduate of Fort Hays Kansas State College, Mrs. Francis has served on its public relations staff for the past six years. She is also a writer of books for teen-age boys.

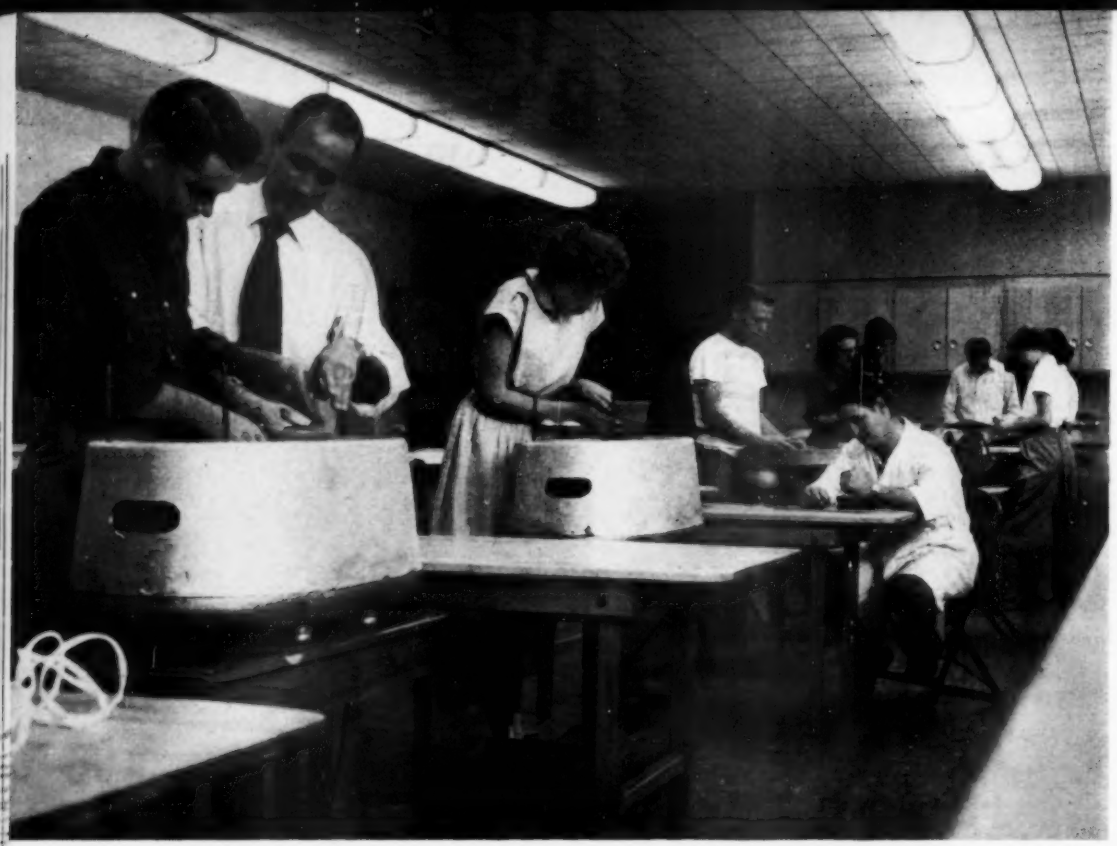
EYEBROWS are frequently raised when a new building is planned for a section of the college campus which is considered more or less remote, and it is a credit to the building when it does not remain isolated but draws the remainder of the campus to it, in a psychological as well as physical sense.

Such was the case of the new Applied Arts Building, completed in September, 1952, on the Fort Hays Kansas State College campus at Hays, Kansas. It was built on the northern edge of the campus, across a large draw which students had for many years regarded as a sort of boundary to the campus proper. It was not until after the building was completed that the draw was filled in, the area landscaped and the dreams of its planners justified when the new area suddenly became a large and attractive corner of the campus.

The Applied Arts Building, which was formally opened at the celebration of Fort Hays State's fiftieth anniversary, October 1952, now seems as accessible as any campus building. The numerous activities of the departments of art, home economics and industrial arts, which it houses, have brought thousands of visitors as well as students through its doors during the year.

Administrators of Fort Hays Kansas State College, which has an enrollment of 1,300 students, began dreaming of a new Applied Arts Building as far back as 1941 when the equipment and facilities of the Industrial Building began to be outmoded and taxed by larger enrollments. In the industrial education department particularly the need was felt for larger quarters. The courses offered in this department had been greatly expanded in recent years to satisfy the demand for more practical training for the farm youth of western Kansas. Courses had been added in farm mechanics, automotive mechanics and welding and these had been housed in temporary quarters.

Facilities in the home economics department were



A class in pottery-making finds a combination of natural and artificial lighting helpful in producing better pieces of work and in keeping color uniform.



Facilities for a wide variety of craft work have been included in the crafts room of the Applied Arts Building.

not adequate to fulfill the needs of young women, many of whom were interested in courses in this field to prepare themselves to be better homemakers even though they were majoring in another field. In the art department facilities for crafts classes, which are extremely popular at Fort Hays State, were almost entirely makeshift. There was no provision for display of art exhibits and the rooms were unsuitable.

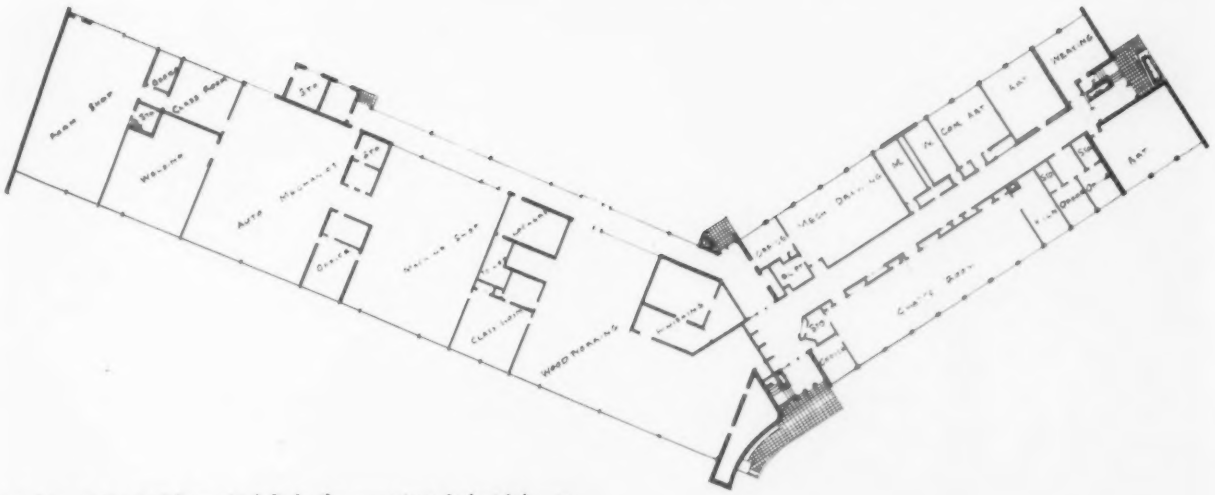
Seventeen Months to Build

Construction on the new building was begun in April, 1951, and completed seventeen months later at a cost of $722,446. Shaver and Shaver, Salina, Kansas, were the architects. The general contractor was Busboom and Rauh, also of Salina. Amerine Electric Company of Great Bend, Kansas, had the electrical contract and D. G. Zimmerman, Hays, the plumbing contract.

Natural stone was used in the structure to match the eleven other permanent buildings on the campus. It includes two wings, which come together at a 120-degree angle (determined by an existing heat tunnel and a large group of trees which the planners were anxious to keep intact).

East and West Wings

The east wing, which is two stories high, houses the classrooms and laboratories of the departments of art and home economics. The west wing, one story



First floor of the building. At left is the one-story industrial arts section. Two story wing on right houses art and home economics.



The extensive modern equipment provided here makes this one of the outstanding machine shops in the state of Kansas.

high, houses the department of industrial arts, including shops for classes in farm power and farm mechanics.

Extensive Glass Areas

The building is extremely modern and functional in design, with extensive glass areas and a solar sunshade designed to let sun into the rooms during the winter and to keep it out during the summer.

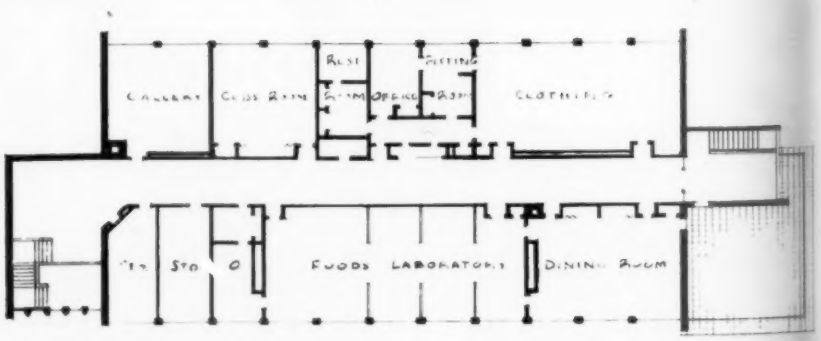
The two-story wing is built with a reinforced concrete framework, concrete floors and a flat, built-up, pitch and gravel roof. A sun terrace opening off the dining room of the home economics department, which also serves as a function room for various social events, is at the east end of the building. The shop wing has rigid steel frame bent supports with a pitch and gravel built-up roof over wood planks. Here, too, glass has been used liberally.

The entire building is equipped with instant-start slim-line fluorescent lighting with an illumination level of 35 to 50 foot-candles in the classroom and office portions. The woodworking shop is equipped with a dust-collection system so that sawdust and dirt are picked up automatically. The shops have buss-duct power wiring so machinery may be easily changed.

Asphalt tile was used for floors in the corridors, classrooms and offices throughout the building, with



Steel kitchen units make up the equipment of the home economics department. There are six such units.



Second story of the art and home economics wing of the Applied Arts Building.



Homecrafts courses, added to the curriculum when the new building was opened, include knitting and other skills. Students are shown seated in front of the modeling mirror which has an elevated modeling platform.



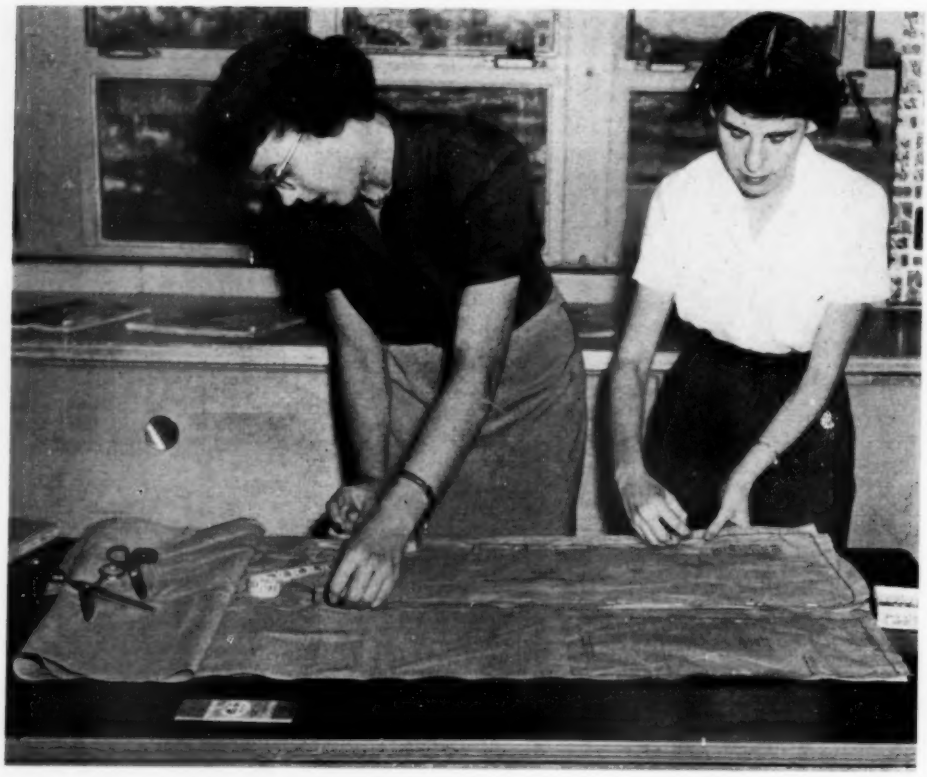
The latest in engine tuneup equipment gives students training of the most practical sort. There are facilities for major and minor automotive repairs.

quarry tile floors in the toilet rooms and on the terraces. Glazed tile was used for wainscoting. The open feeling of the building is further enhanced by aluminum-framed, all-glass entrance and vestibule doors.

The modern note of the building has been continued in its furnishings. Modern steel furniture was installed in all of the offices. New equipment was installed in all laboratories and classrooms. Ultra-modern furniture in an upstairs lounge has made the place a point of great interest for visitors, many of whom see these pieces for the first time in the type of setting for which they were designed.

Home Economics Equipment

In the home economics department added facilities include four sewing table units with Necchi machines, cutting space and ironing boards; a deep-freeze unit; a laundry unit including washer, ironer and dryer; and a kitchen with six units. Two lighted, full-length mirror areas opposite each other in the corridor



Classes in clothing construction enjoy their spacious new quarters with a maximum of natural light.

of the home economics areas are useful as well as attractive. In addition, a large modeling mirror has been placed at the west end of the clothing laboratory. There is a large fitting room and a spacious ladies' lounge in the home economics department. Modern draperies and decoration complete the picture. The dining room is carpeted, has modern draperies and furniture and is semi-divided into a living room and dining area.

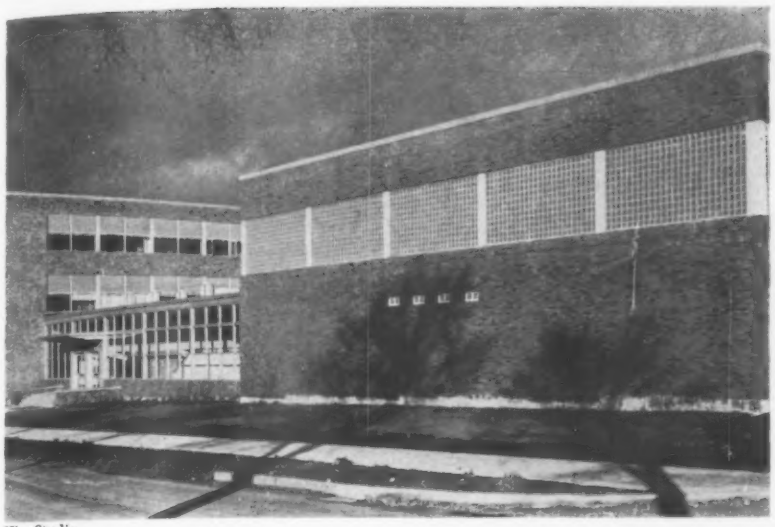
In the art department the completely new equipment, functional room space and adequate exhibit areas are a joy to both faculty and students. Studios for painting, design and weaving have been planned to meet both present and future needs of the students. Modern-fold doors may be used to separate a large crafts room into two smaller areas. Display areas are the particular pride of the art department. Recessed areas, well lighted, are located in the foyer and the corridors of the classroom wing. A special gallery room for art exhibits is on the second floor of the building.

Industrial Arts Activities

In the industrial arts department facilities for woodworking students occupy some two thousand square feet of floor area. Other rooms are specially equipped for the following activities: machine shop, bench metal and sheet metal; major and minor automotive repair, tuneup, preventive maintenance and safe-operating procedures; electric welding, oxy-acetylene welding and heat treating; practical electricity; drafting; and practical classes in farm power and farm machinery.

One of the building's features most appreciated by faculty members is the great amount of closet and storage space in laboratories, classrooms and offices.

Student capacities for the various laboratories are as follows: mechanical drawing, 32; welding, 17; woodworking, 17; crafts, 15; clothing, 16; foods, 24.



Withycomb Hall, showing dairy manufacturing wing on the right, main entrance in the center and office and classroom wing in the rear.

Hise Studio

ANIMAL INDUSTRIES BUILDING AT OREGON STATE COLLEGE



by FRED M. SHIDELER

Director of Information, Oregon State College

A journalism graduate of Kansas State College, Mr. Shideler worked on newspapers in Ohio and Kansas. He joined the staff of Oregon State College as instructor in journalism and assistant in the news bureau. Later Mr. Shideler was named head of the journalism department and director of the news bureau. He obtained his master's degree from Oregon State in 1941. He has done considerable freelance work and serves as special correspondent for press associations and daily newspapers.

THE new animal industries building at Oregon State College, formally dedicated May 24, 1952, gives this far western institution one of the most modern facilities in the nation for research and teaching in animal and dairy husbandry and in dairy manufacturing. The new structure, Withycombe Hall, bears the name of one of the pioneers in western agricultural education, Dr. James Withycombe. First head of the animal husbandry and dairy departments at Oregon State College and also director of the agricultural experiment station, Dr. Withycombe later became state veterinarian and finally governor of Oregon before his death in 1919.

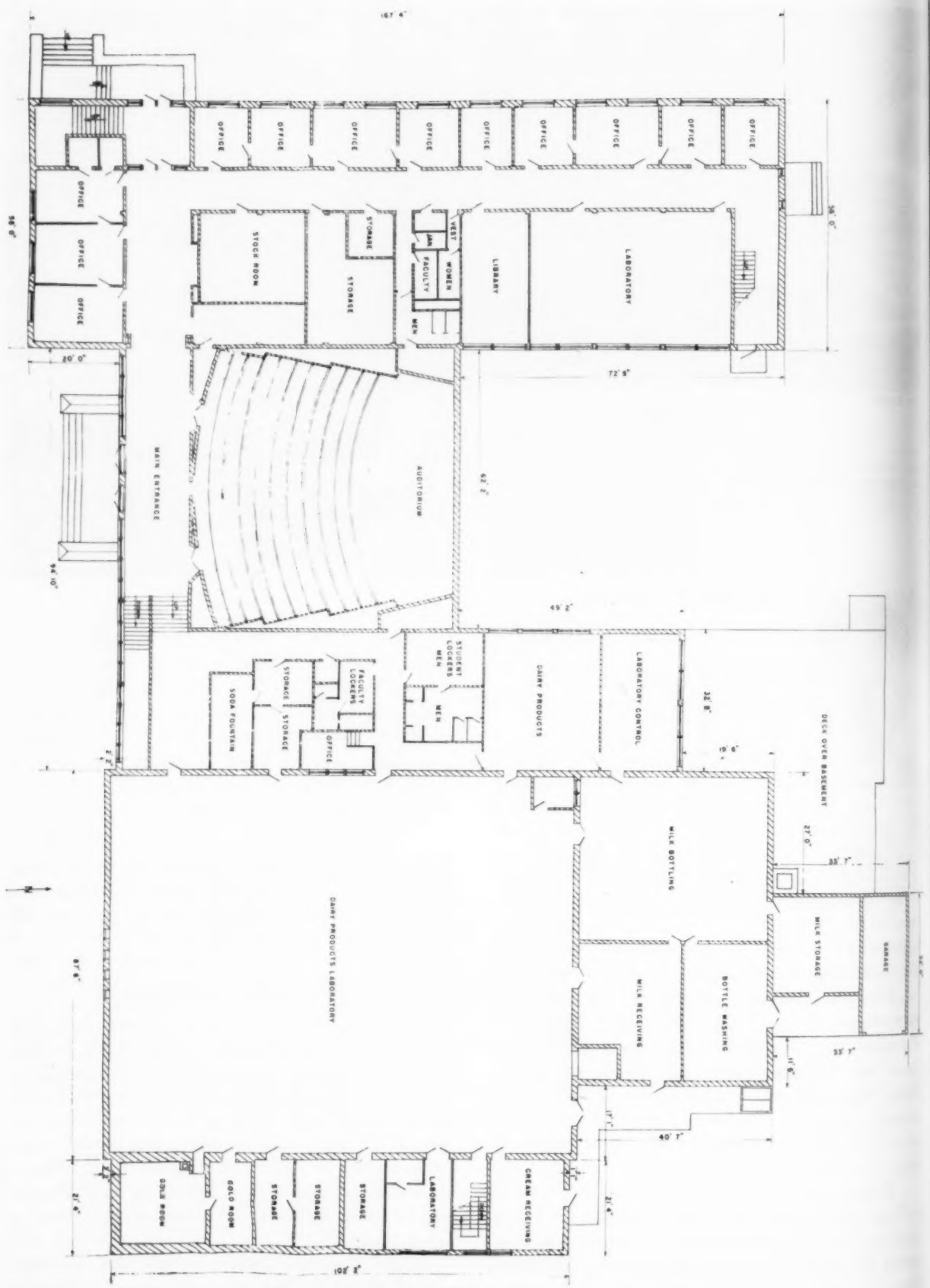
Three main units make up the 260 by 180-foot building—a three-story office, classroom and laboratory wing used by both departments; a central auditorium seating 234 persons; and the dairy products laboratory wing.

When Withycombe Hall was in the planning stages many factors were considered, especially in connection with the dairy products laboratory rooms. Here research and instruction would be carried on in such processes as the making of ice cream, butter and cheese.

Factors Under Consideration

These factors included floor material and drainage, wall material and color, purity of air, lighting, ventilation, dust and insect control, noise control, location of utility lines (steam, cold and hot water, electric, chilled water, used water return), construction and location of refrigerators, cheese curing, starter preparation, testing of dairy products, etc. Such things as water conservation, type of flooring to avoid slippage, type of refrigeration and location of equipment required study.

The three-story office, lecture and laboratory wing is 56 by 167 feet. All rooms, except some storerooms where the building adjoins the auditorium, admit daylight through sections of clear glass and glass



First floor plan of Withycomb Hall, Oregon State College. Three main units complete the building—a three-story office, classroom and laboratory wing, central auditorium and dairy products wing.



Interior of the dairy manufacturing laboratory in Withycomb Hall before equipment was installed. On the right are refrigerator and cold storage rooms. In the rear are milk receiving, bottling and washing rooms and the milk receiving area.

block. The corridors, extending the full length of the building on each floor, are off-center to permit offices of the desired size and more spacious classrooms and laboratories. All offices except administrative are located on one side of the corridor. Classrooms, seminar rooms, laboratories and storerooms are opposite.

The auditorium is a one-story structure 63 by 60 feet. It is arranged as a theatre with seats for 234 persons. The room is used for lectures and demonstrations and has become particularly popular for meetings of off-campus organizations. A cloak room adjoins the auditorium.

Dairy Products Laboratory

The dairy products laboratory, a one-story structure with a full basement, is probably the most unusual section of the entire building. Overall dimensions are 141 by 180 feet. The center portion—with a height of 22 feet—is divided into two parts. One section, which is 87 by 105 feet, is designed for the manufacture of all dairy products. It has no partitions nor overhead installations. This permits a flexible, efficient operation. The other part, which is 70 by 40 feet, has three sections: one for milk receiving, one for bottle washing and supplies and one for pasteurizing fluid milk products.

Extending along the sides of the large manufacturing room are refrigerators for butter and ice cream, starter room, supply rooms, dairy products testing room, dairy products judging room, an observation platform, lockers and wash rooms and a dairy products sales room and counter.

Floor Slopes to Drains

The floor in the manufacturing room is constructed of concrete on which is laid vitrified non-skid brick, joined with resinous cement mortar. The floor slopes one-fourth inch per foot toward the drains. High points of the floor are along the four walls and lengthwise through the center of the room. Glazed tile of a light buff color extends from the floor to the ceiling except where large blocks of glass brick have been installed. There are no supporting posts in the room.

No equipment is located adjacent to the walls in this room, thus favoring sanitation and convenience in trucking products and supplies. Several stainless steel hand washing sinks and several hose stations for hot and cold water are provided, plus added utility con-



Three-story office, classroom and lecture wing of Withycomb Hall is used by departments of animal and dairy husbandry and dairy manufacturing. A library is also included in the wing.

nections for installation of equipment in the future.

Dust and Insect Proof Milk Room

In the fluid milk products room and in the dairy products manufacturing room there are no ledges, sharp corners or crevices in which dust and insects can lodge. The air-circulation system makes it possible to maintain a low relative humidity. There is no condensation of water vapor on walls and ceiling, thus making control of molds and odors possible. The laboratory has been designed for convenience, adequate instruction, orderliness, sanitation and durability.

The 12-foot high basement room extends under the complete dairy products wing. Along one side of the basement are six insulated rooms for curing and storing of different varieties of cheese. The floor, walls and ceiling of each room are covered with tile. Automatic temperature and humidity controls are provided.

On the other side of the basement are technical laboratories that are used for courses in dairy technology, testing and technical control methods, and for research involving chemical and bacteriological studies. Walk-in incubators and refrigerators are located adjacent to these labs, as are supply rooms and a room for washing and sterilizing. An unfinished pilot laboratory room is also located in the basement, as is a section for a steam boiler and accessories. Part of the basement is used for storage of supplies and manufactured products. Located here also are compressors for refrigeration, electric transformers, the chilled water system, water heaters and a repair shop.

One of the outstanding features of the building is its flexibility. From the first stages of planning, the emphasis was on efficiency of design so that facilities can be adapted to new and later trends in the fields of animal industries and dairy manufacturing.

The building meets all earthquake design requirements and its foundation rests on piling. Contractual costs of Withycombe Hall were $934,412 although the total cost was $1,194,076. This latter figure, however, includes such items as fees, landscaping, roads and walks around the building, steam lines and considerable equipment and furnishings.

Those Who Took Part

The architect was Glen Stanton of Portland. Consulting engineers were J. Donald Kroeker of Portland, mechanical; Pettengill and Kelley of Portland, electrical; Jerome McDevitt of Portland, structural; and Dames and Moore of Portland, foundation. Richard A. Adams, superintendent of the Oregon State College physical plant, worked closely throughout construction with the architects, engineers and contractors.

The Donald M. Drake Company of Portland had the general contract, Kern Electric Company of Albany, Oregon, the electrical contract, and Tide and Bay Company of Tacoma, Washington, the mechanical contract.

A CENTRAL CHILLED WATER AIR CONDITIONING PLANT FOR THE UNIVERSITY OF OKLAHOMA



by BENNIE SHULTZ

Assistant Director, Physical Plant, University of Oklahoma, Norman, Oklahoma

Mr. Shultz holds B.S. and M.S. degrees in Electrical Engineering. He has maintained his present position with the University of Oklahoma since 1925. Mr. Shultz is in direct charge of all mechanical and electrical equipment, including the power plant, at the university. He has supervisory control of all utility extensions made on the campus. This includes water, electricity and steam production and distribution, and natural gas distribution.

THE University of Oklahoma is located in south central Oklahoma where the summer temperature reaches quite high levels (100° F. and above) for considerable periods of time. During these hot spells, walls of the buildings become very hot and academic work is carried out with great difficulty and discomfort. Because of the above seasonal heat, the governing board of the university realized that if university plant facilities are to be used throughout the year, extensive air conditioning is necessary in those buildings most in use during the summer months. The type of long-range air conditioning program to be undertaken had to be decided before any large scale air conditioning of complete buildings was undertaken.

A careful study was made of air conditioning in similar institutions in the southwest so that advantage might be taken of the experience of these institutions, and to avoid repeating mistakes which have been made in the past. The institution with the longest and most varied experience in air conditioning is Southern Methodist University located in Dallas, Texas. We found the advice of Stanley Patterson at that university most valuable and helpful.

Reasons for the Decision

We decided on a central chilled water plant located adjacent to our power plant for the following reasons:

1. Cooling towers located in the academic areas of the university are unsightly, noisy and hard to keep from smelling like a frog pond. The hot humid air discharged from a cooling tower is most objectionable to people in nearby buildings that are not air-conditioned. Larger cooling towers are more efficient and more easily maintained than smaller towers with equal total capacity.

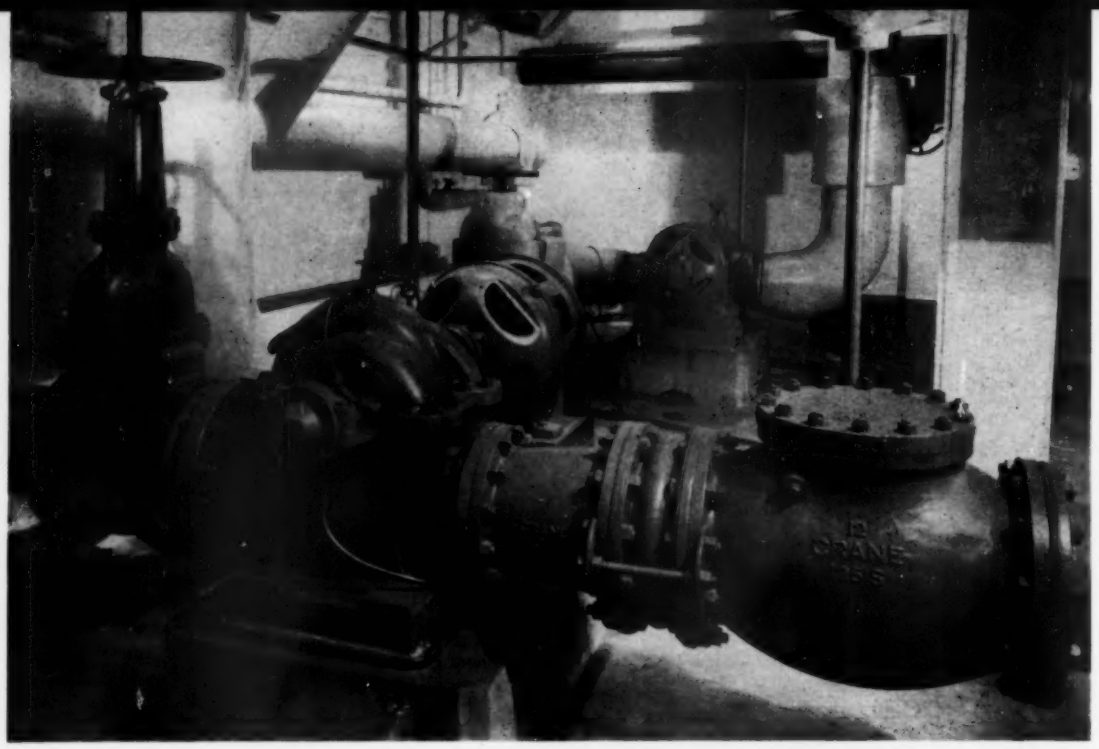
2. Air conditioning compressors located in the building being air-conditioned would have to be electric motor driven machines. These compressors in the larger sizes are all very noisy and this is most objectionable in academic buildings.

3. By using large machines and locating these compressors adjacent to the boiler plant, steam turbine driven centrifugal compressors can be used with consequent ease of capacity control and economy of operation.

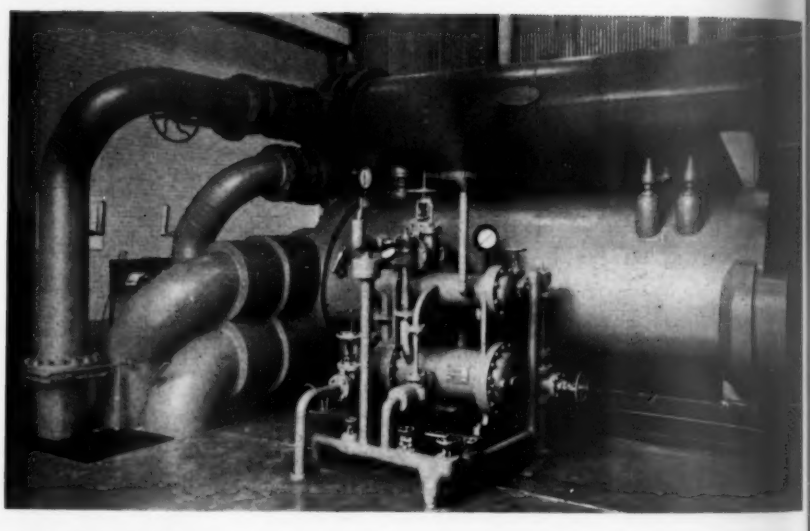
4. Our experience with smaller air conditioning machines has demonstrated that direct expansion coils are not very satisfactory for air conditioning. When the weather gets very hot and the machine runs most of the time, there is a tendency for the coils to ice up and this reduces the cooling capacity of the coil and the efficiency of the system. With chilled water it is impossible to form ice in any part of the coil. Therefore, the entire surface of the coil and fins is working at top efficiency at all times.

High Outlay for Water Lines

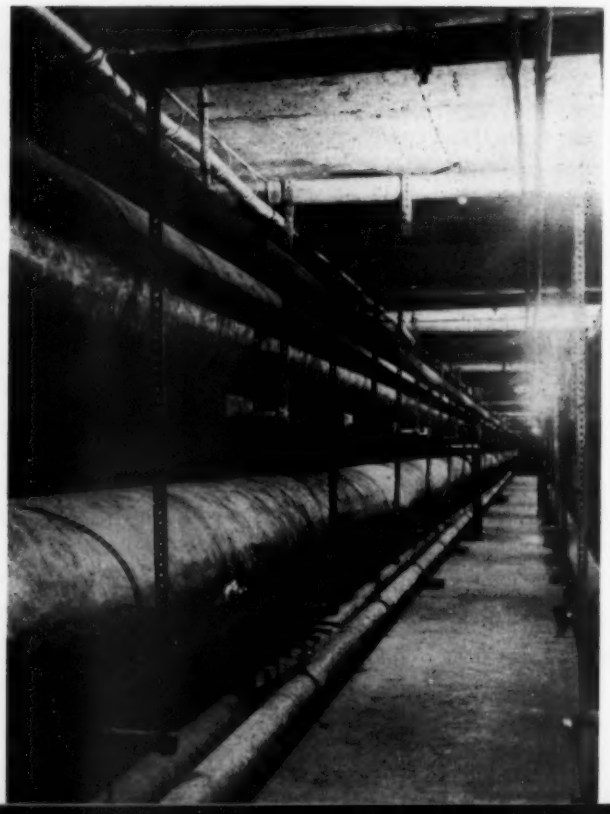
The only objectionable feature of a central chilled water plant is the original investment in cork insulated chilled water lines in the utility tunnels connecting the chilled water plant with the buildings being air-conditioned. We believe that the greater operating economy achieved with water chilling machines located adjacent to the power plant, where the machinery is constantly checked by skilled engineers in charge of the power



Circulating water and chilled water pumps are located in the basement of the new plant. The circulating water pump is in the foreground.



At the right is shown the Freon "11" condenser and water chiller. The steam jet vacuum pump is also shown. Below is a view of the utility tunnel in which are installed the cork insulated 16-inch chilled water lines.



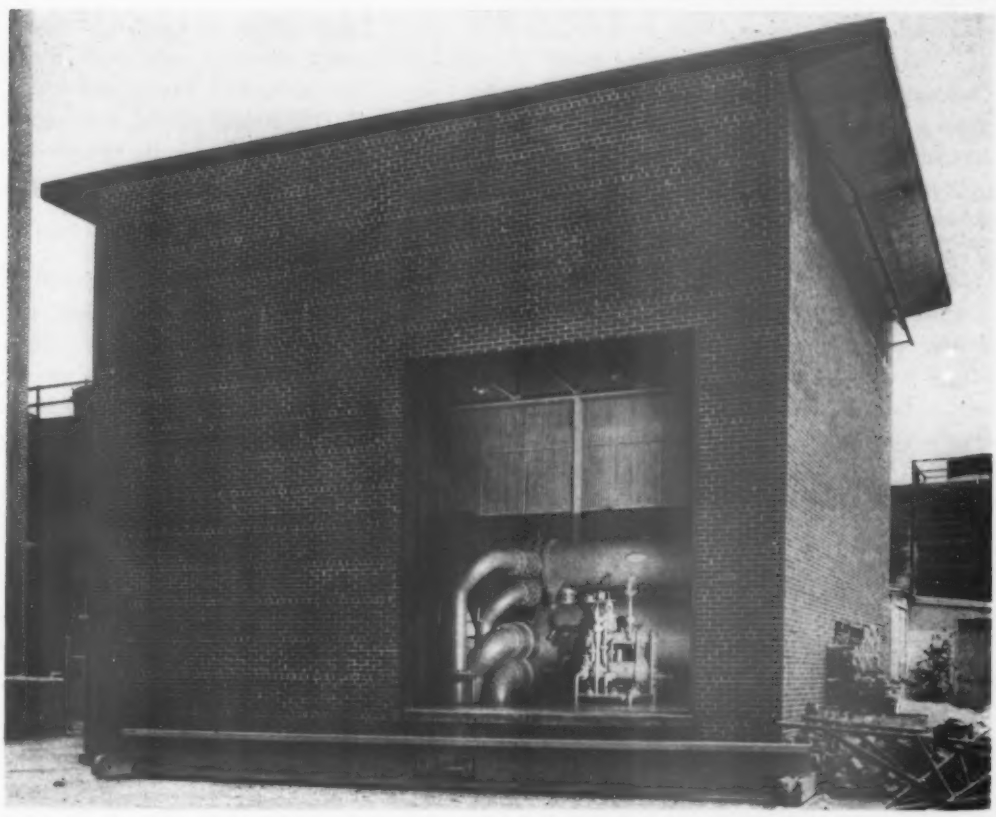
plant, and the more economical drive obtained by the use of a steam turbine will justify the additional capital outlay for insulated chilled water lines in a very few years.

Designed for Unit Operation

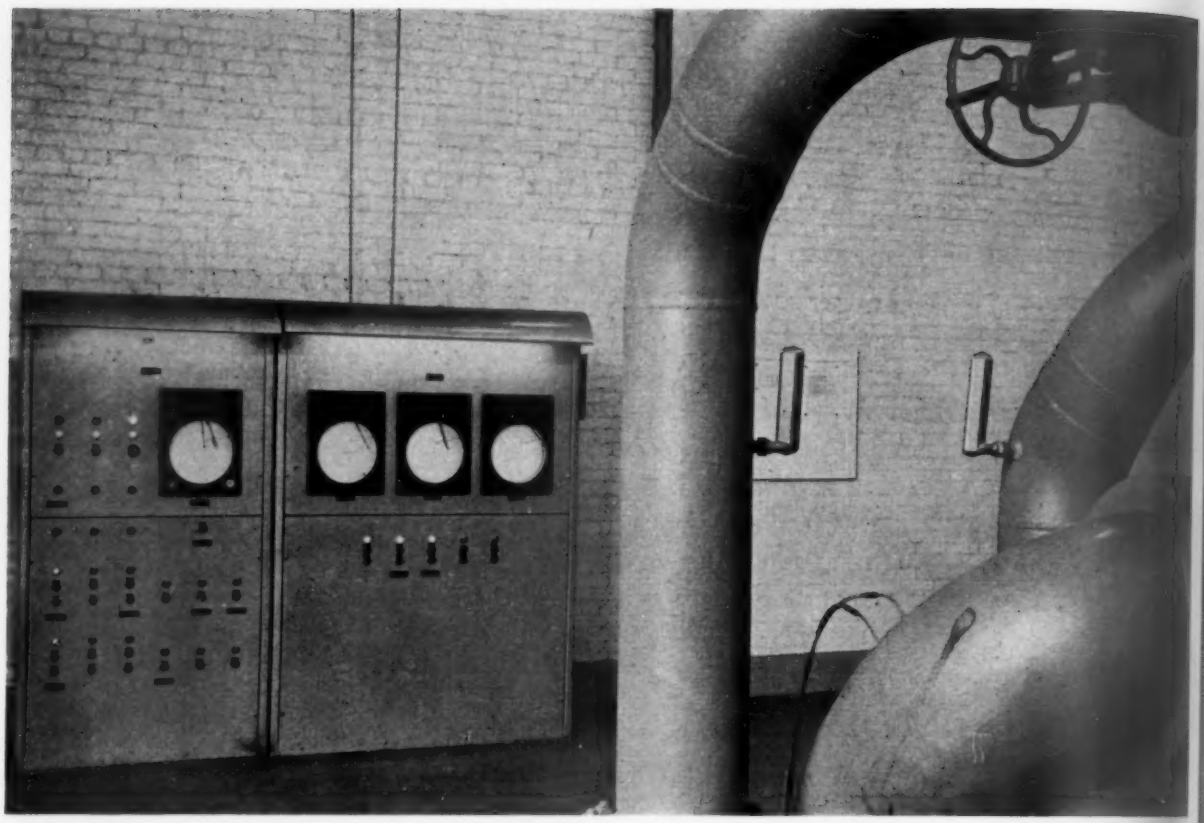
Our present plant is designed for an ultimate installed capacity of 3,000 tons of refrigeration. At present we have installed one 1,000-ton Carrier centrifugal compressor complete with condenser and water chiller. This compressor is driven by a 1,150-h-p. Westinghouse steam turbine using steam from the adjacent power plant at 425-lb. pressure and 750° total temperature. The plant is designed for unit operation. Each 1,000-ton water chilling unit will be complete with its own circulating water and chilled water pumps. The mains were designed of sufficient size to permit expansion of the plant to 3,000 tons without the mains being enlarged. The circulating water mains are 24 inches



Steam turbine drive and centrifugal compressor, located in the University of Oklahoma chilled water air conditioning plant. Large machines such as this can be used with ease of capacity and economy of operation.



General view of the new building which is adjacent to the university power plant. Cooling towers can be seen in the background.



Control board of the chilled water air conditioning plant. Coston and Frankfurt, architects and engineers of Oklahoma City, designed the building and the arrangement of the equipment in the plant.

in diameter and the chilled water mains are 16 inches in diameter.

Chilled water leaves the plant at 40° F. and has a maximum return temperature of 55° F. under maximum load conditions. We find that with 40° water it is possible in this dry climate to effectively control the humidity of the conditioned buildings by proper use of face and by-pass dampers without the use of steam for reheating the chilled air.

This makes for most economical operation. Because of the low temperature of the water leaving the water chilling plant, the chilled water mains are insulated with a 3-inch layer of corkboard. This is applied with hot asphalt as wedge shaped lags cut from special density corkboard. The heat loss through this insulation on 2,380 feet of 16-inch line is less than five tons.

The building and complete installation of the first unit cost $211,301.87. The cost for 2,380 lineal feet of 16-inch chilled water mains was $21,804.41. Architects' fees were $10,643.29. No cooling towers were installed for this first unit since two old towers, which were formerly used with the old power plant, were available and have been used. Towers to serve this 1,000-ton unit would cost approximately $40,000 new. The building can be extended to house the two additional units without disturbing any part of the present installation.

Architects and Engineers

Coston and Frankfurt, architects and engineers located in Oklahoma City, designed the building and the arrangement of the equipment in the air conditioning chilled water plant building.

The 1,000-ton compressor has been only approximately one-third loaded so far. With this load our operating cost is approximately one cent per ton hour of refrigeration to air-condition from this central plant. With greater load, the cost will be less.



DAVIDSON COLLEGE PRESBYTERIAN CHURCH



by JOHN P. DILLON

Director, News Bureau, Davidson College, North Carolina

John P. Dillon is a native of Asheville, North Carolina. A graduate of Wake Forest College, he served with the 8th Air Force during World War II. Before becoming director of the Davidson College News Bureau Mr. Dillon was assistant director of the Wake Forest College News Bureau and continuity director of Radio Station WPTF.

DAVIDSON College, Davidson, North Carolina, realized a dream of more than 20 years when its handsome new $800,000 Presbyterian Church was formally dedicated to the glory of God in the upbuilding of the spiritual life of the community. It was more than two decades ago that trustees of the college and officials of the church first started planning for a new structure to replace the old church which was completed in 1885.

In 1943 a special campaign realized some $270,000 for the erection of a new church. The war interfered with construction at that time, however, and it was not until the completion of the $2,500,000 Davidson Development Program that enough funds were on hand to begin construction. Several thousand individuals and organizations contributed to the campaign, with more than a hundred donating specific memorials for the new church.

Of the contributors a special note should be made of the generosity of Mr. and Mrs. W. Z. Stultz of Charlotte, whose large gift made possible the sanctuary, and donation of the Schlicker Organ by Mrs. Clarence Hodson of Orange, New Jersey.

Actual construction of the church took exactly two

years. The ground-breaking ceremonies were held during the 113th Commencement. The night before the dedication, two years later, workmen labored around the clock in order to have the church ready for the several thousand persons who attended the impressive ceremony.

The architecture of the church, built of red brick and Indiana limestone, has been described as American Classic Revival or modified Georgian. The buildings are divided into three main units, the sanctuary seating more than 1,000, the education building, accommodating about 200, and the chapel with a capacity of 170.



Sanctuary of church, Harold E. Wagoner of Philadelphia, architect. Commencement exercises are being held with President John R. Cunningham at the lectern.

All units together contain approximately 750,000 cubic feet. The overall dimensions of the sanctuary are 140 feet long and 70 feet wide. The narthex is 16 feet by 31 feet, the nave, 54 feet by 100 feet, and the chancel is 36 feet by 40 feet inside measurements.

Report of the Architect

Harold E. Wagoner of Philadelphia, architect for the church, reports:

"Although the primary goal of the architect is the effective use of space, the design of Davidson College Presbyterian Church involved consideration of several additional and rather unusual factors. The first, and perhaps the most important, was the creation of an architectural setting which would reflect the dignity of the Presbyterian heritage which one associates with Davidson College.

"Secondly, there was a need for designing these buildings with a tower 150 feet high in a way which would successfully modify and contribute to the architectural merit of the main building on the campus, Chambers Hall, without seeming to compete with it.

"The third consideration was the desire on the part of the college and architect to produce a building which, although basically traditional in character, would 'succeed not only by imitation, but by interpretation' in accordance with Thomas Jefferson's oft repeated admonition.

"It was ultimately decided that some of the smaller buildings closely associated with Woodrow Wilson's student days at Davidson should be used as pivot points from which an axis was established for use as a center line of the new church. The actual site chosen was very close to that occupied by a small brick American Gothic village church.

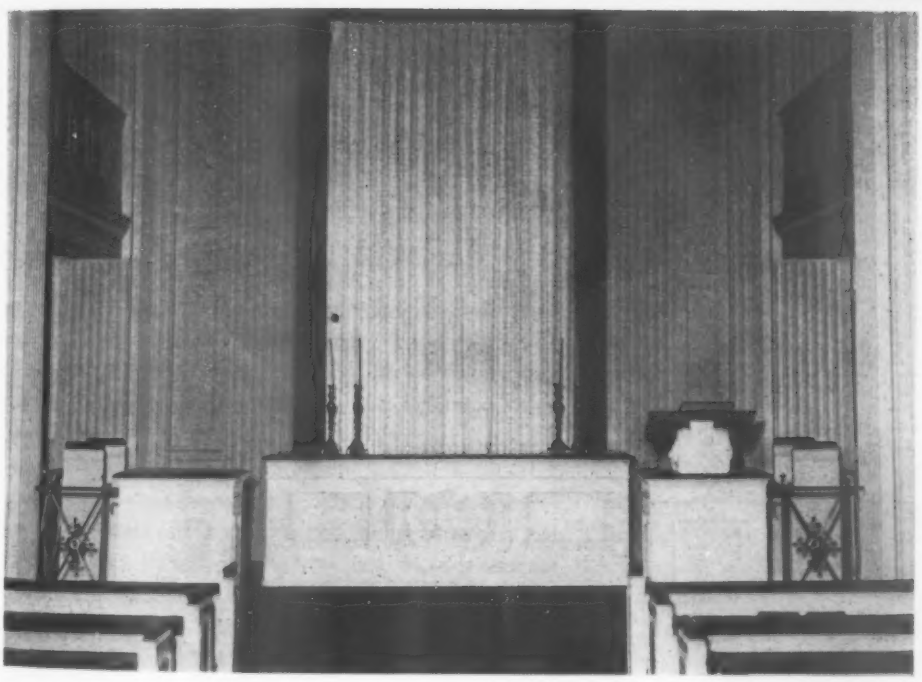
"The walls of the church are brick backed up with masonry units which are furred and plastered. A considerable amount of limestone trim has been used on the exterior of the building. The tower itself is principally of limestone over masonry units and steel. The spire is of copper surmounted by a metal cross which has been goldleafed.

Open Choir Chancel

"Because of the importance of Davidson College to the Presbyterian world considerable thought and effort were expended upon the design of the chancel. It is based upon the so-called open choir. That is, the choir members face each other instead of facing the



Stage of the banquet hall of the church. The hall will accommodate approximately 200 persons and has an adjoining kitchen.



Walter L. Lingle Chapel was named for Davidson's twelfth president and seats about 170 people.

congregation. The focal point in the Chancel is a tall reredos, into which a white dossal has been inserted. A suspended wood cross, goldleafed, hangs upon the dossal.

"The communion table, in proper Presbyterian tradition, does not touch the reredos, but is placed sufficiently forward toward the congregation to permit three clergy chairs to be placed between it and the dossal. Above the pulpit, there is a tester or sounding board, which serves not only to reinforce the minister's voice, but also to place an aesthetic emphasis upon the importance of the pulpit and the beginning of the chancel. The font is located to the right of the lectern. It is placed upon a platform and has a small wrought iron railing in front of it.

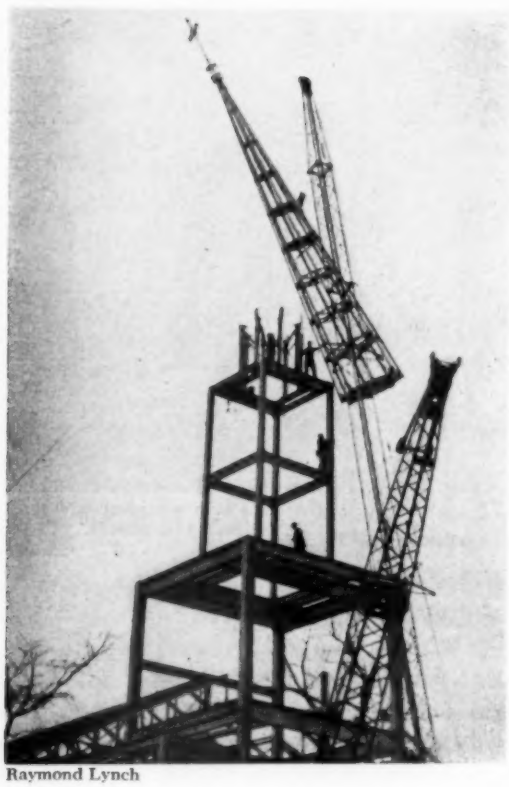
Heating and Ventilation

"Because the building is not occupied by great numbers during the summer months, there is no cooling. However, the building is heated in the chapel and sanctuary by means of forced warm air. This way tempered fresh air may be introduced in the winter months, and a certain amount of fresh air may be introduced through the same ducts during the warm weather periods."

A criterion of how completely Mr. Wagoner accomplished his objectives might be taken from the vast interest and numerous inquiries received concerning the new church. Many ministers and laymen have come to Davidson during the past months to look over the architect's plans and to go over the new



The campus of Davidson College. The new church is in the left foreground.



Raymond Lynch

A high point in the construction of the church was placing the 150-foot tower atop the building.

structure in detail. Without exception, all have been very enthusiastic and their comments have brought much favorable attention to the community and college.

Importance to Life of Community

Under the leadership of the pastor, Rev. Samuel W. Newell, the new church has already proved its importance in the life of Davidson. It has become the focal point for not only the spiritual life but, in many respects, is serving equally well in the social and educational activities of the college and community.

Both college officials and church leaders have been unstinting in the praise of the new edifice, and all feel that it is truly fulfilling the destiny which was predicted for it more than 20 years ago.

TOP LIGHTING vs. SIDE LIGHTING FOR SCHOOL INTERIORS



by DONALD BARTHELME

Architect, Donald Barthelme and Associates, Houston, Texas

Donald Barthelme was graduated from the University of Pennsylvania. He began his architectural practice in 1940 and has taught architecture at the University of Houston from 1946–1953. In 1953 his design of the West Columbia Elementary School, West Columbia, Texas, won him a top award in the 1952 Competition for Better School Design, sponsored by *The School Executive* magazine.

IF someone had asked you, as architect or illuminating engineer, to light a space at night solely from one side, you would know you had a job on your hands. If the space was two to three times as wide as it was high, you probably would question whether it could be done satisfactorily, and privately would wonder why anyone should insist on such a stipulation. You might explain that in trying to get light into the space on the far side, using direct sources, you simply create a group of headlights intolerably bright to users of the space. If you resorted to totally shielded indirect sources, you would be caught between the enormous wattages required and the wide variations in brightness of the ceiling above the fixtures and in the distant corner.

In either case all those active within the space would be uncomfortably conscious of the lighting means and would be forced to arrange their activities directionally with respect to source on a right-handed or left-handed basis. If your client persisted in this arbitrary requirement, you might ask to have the space redesigned, reducing the width, or perhaps you would try tricks with the ceiling, or invent other means of overcoming a bad situation. But if that client additionally asked that he be able to see "out" through or around his light sources, it would be time for a sane man to close his briefcase and depart.

Fairly recognizable by now is the conventional side lighted classroom and its lighting difficulties, restricting school planning to relatively narrow and long extended wings with problems of orientation, circulation and remoteness from central activities. Derived from houses where spaces are normally 12 to 15 feet in width, the window continues in use for lighting without reexamination in applications to spaces two to three times as wide. Even in the home, when a real task presents itself, one goes "to the window" to be able to see—a manifestly impossible solution for a large group.

Increases in ceiling height—long an ineffectual part of building codes—or increases in intensities and areas fail to allay the basic problems and the latter bring new difficulties in shading, louvering or other gadgetry. All such devices diminish the total light available for end-use, hence bring more and larger openings, then more devices—and so on for a merry-go-round.

You give up on one side and try for two—and get

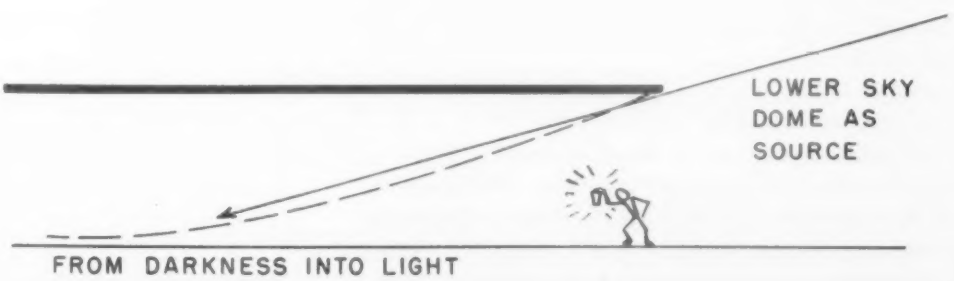
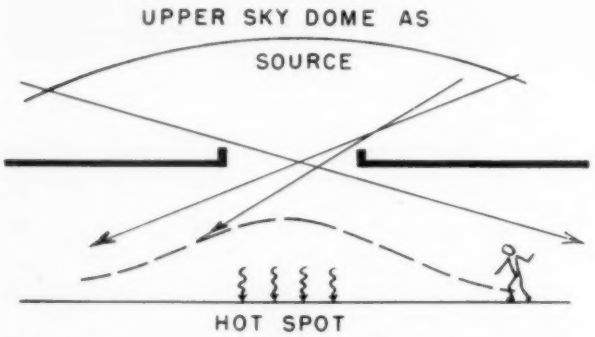


Diagram shows the direction of light within an area when there is side lighting which employs the lower sky dome as the source.

a nice set of double shadows, two brightness areas, two sets of louvers and two merry-go-rounds. Want to go for three? Or exercise your ingenuity with up-ended ceilings, bent ceilings, bi-part ceilings in order to bounce the incoming light around until, limp and wasted, it drops weakly useful onto the desk top. In this wrestling match, open your purse wide and get set for a flock of new maintenance problems.

Normal Conditioning to Light

Most schools are one story with only roofs between them and the most magnificent and abundant light source of all, ready to be put to use at the focal point of each pupil and teacher at task, chalkboard or demonstration. Through the roof comes the light and the eye



When the upper sky dome is a source of direct, uncontrolled light, area directly beneath the opening becomes a hot spot.

is naturally equipped with forehead, eyebrow and eyelid as flexible devices, unconsciously brought into play to control seeing conditions no matter how various or constantly varying. This normal conditioning to light from above has made the eye less sensitive in that direction: the sunny sidewalk is less bearable than the brighter sky above. With close seeing tasks generally below the eye, the natural head inclination involved further shades the organ and makes use of normal body functioning in normal activity. None of these sets any lateral limitation on seeing or requires fixing of relationship of body to light source, and real freedom in pupil grouping is practically possible.

Most sidelighting systems recognize without argument the inherent advantages of top sources and attempt to make the ceiling the secondary source. Good distribution, reasonable intensities and simple logic bear out this approach since research tells us that light from the ceiling is far more effective than light from a side wall in lighting a space.

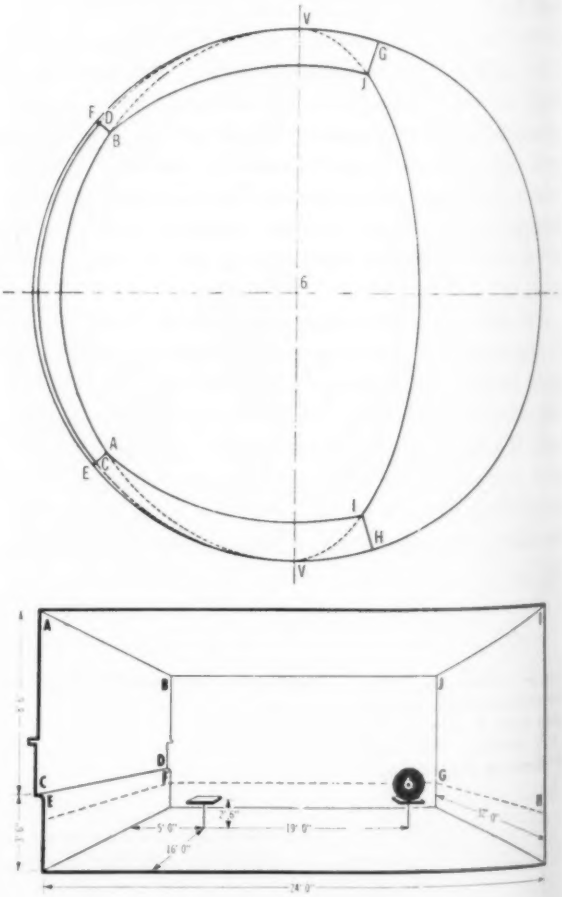
Ceiling vs. Sidewall

Studies by Dr. R. A. Boyd, research physicist at the University of Michigan, show that reflectances of the internal room surfaces supply as much as 80 percent of the total illumination on a given point. The ceiling is by far the most important of these surfaces: see the accompanying diagram for respective areas "seen" by a point midway on the far side of the conventional classroom. On this the ceiling is 16 times (62 percent vs. 3.8 percent) the area of the outside wall and consequently is 16 times as important as the wall in lighting that point. One square foot of ceiling equals as much as 16 square feet of side wall (equal source unit brightness) in equal illumination of the point, while for equal areas the ceiling source can do the job with 1/16th the intensity and brightness of the side wall source.

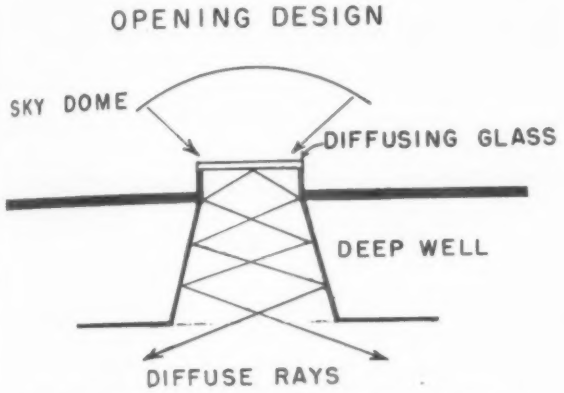
Multiply this advantage by two and one-half, since for every 1,000 foot-candles falling on a vertical (side wall) surface there are 2,500 foot-candles available on a horizontal (roof) surface. So the single square foot of ceiling opening is roughly equivalent to up to 40 square feet of side wall opening as far as illumination of the given point is concerned. Dr. Boyd's tests give horizontal surfaces further advantages in more nearly constant range during the day (2:1 as compared with side wall ranges of 8:1) reducing problems of utilization. There is, therefore, not only a greater and more constant quantity of light available overhead but it is many times more useful within.

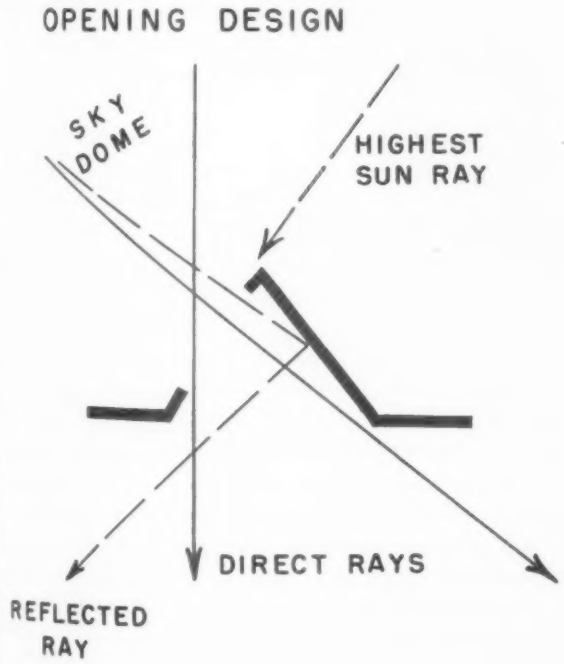
Far more impressive are the advantages of top sources in providing normal and customary environ-

In Dr. Boyd's study (see above) the room area, below, is transferred to a plane surface (within the circle).



mental relationships without restriction on activity, whether individual or group. More subtle, too, is the reversal of interior-exterior by virtue of the illumination from an internal source. Long accustomed to light being on the "outside," our subconscious no longer reacts to the now illuminated walls and confining elements as enclosures. Subjectively "outside," rather than "inside," occupants of the space react accordingly and need less to look out for relief. When these outdoor vistas do draw the eye, vision comes easily without heavy contrasts between sunlit areas and dark window frames,





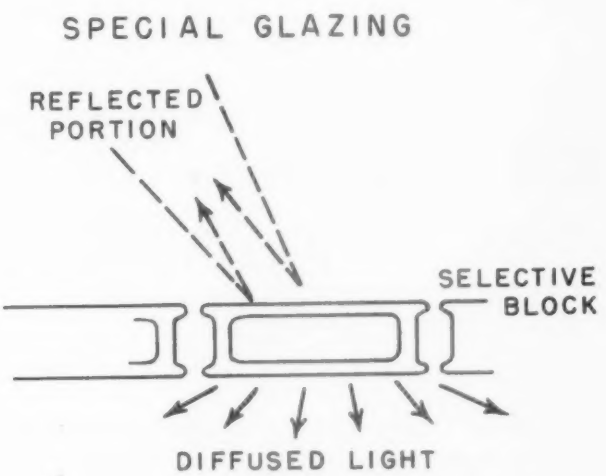
Two possible opening designs. Above is shown the use of diffusing glass while, below, a saw-tooth arrangement permits direct and reflected rays to enter.

which provide conditions of glare and disturbance to seeing nerves. Wide overhangs, long understood for their many advantages, merely shade the outward vision and their usefulness is not purchased at the cost of poor illumination within.

Buildings can be oriented to serve other purposes than lighting and the whole space concept becomes more flexible with entirely new possibilities in organization. Being well toward the upper limit of normal vision, roof openings affect exterior appearance only slightly and the designs of sidewalls are freed to develop character, ventilation and other purposes at will. Like the free plan with its flat roof, free lighting removes a host of habit-formed limitations on design.

New Developments in Top Lighting

There are perhaps as many problems with top lighting as with any other source but no more. It should be noted that those applying are principally in structure, detail and design—all factors subject to the archi-

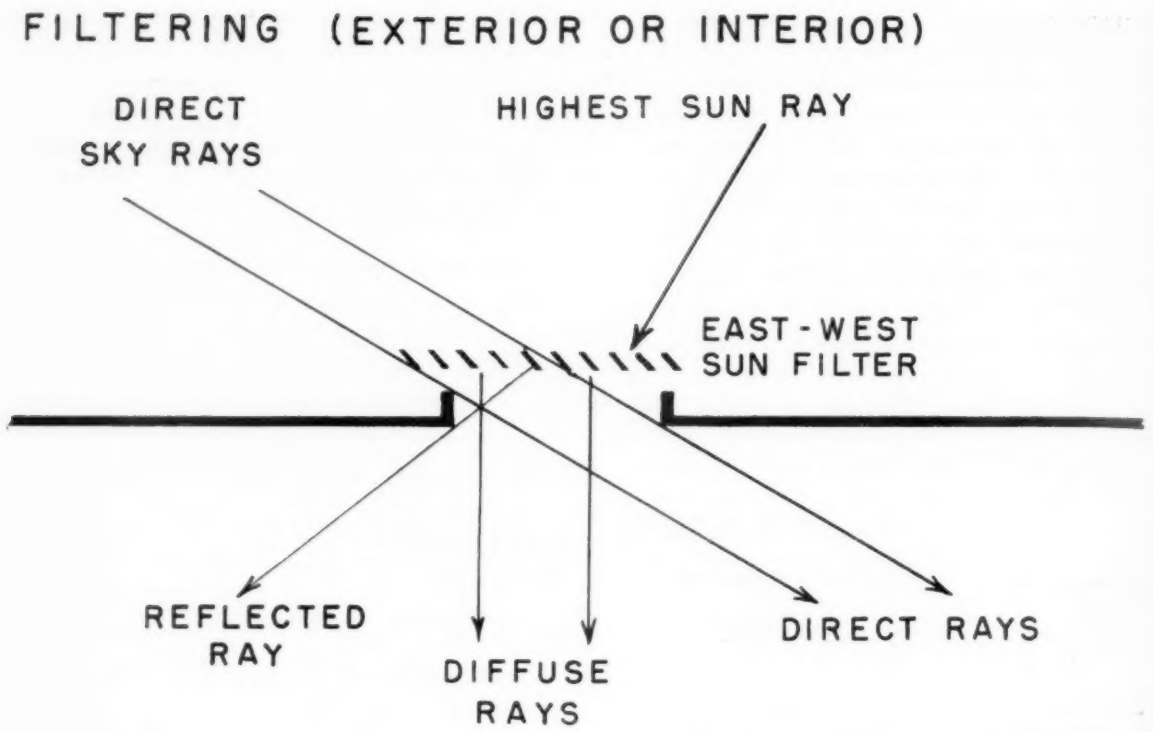


Special glazing will filter the light as it enters and provide diffused light for the room interior.

tect's control through knowledge and skill—rather than in quantity, quality or in usefulness. Top sources have a bad name from the past which does not take into account the technological improvements of the present or newer development in type such as the "bubble" or the "glass block." Heat gain is frequently cited, although higher per unit area can be moderated with the 40 to 1 ratio of total area required.

Nevertheless, top sources are no more proof against poor design than is the window. Although it does not of itself complicate the roof plane, slope or shape, the roof opening does have an effect on structure, being much more efficient with shallow well depths and in thinner constructions. Its location reflects the spaces below and must be recognized in the spacing of framing members.

Controlling devices can be applied either to the exterior or to the interior or in the plane of the glazing material; the choice is the designer's and, whether or not as an element of the total internal surrounding, the roof opening is made to perform other functions as well. When so employed, and requiring for light penetration a certain lightness of construction, it can dissipate



An east-west sun filter permits reflected, diffuse and direct rays to enter at different angles. The area directly beneath the opening receives diffused rays, eliminating hot spots.

the essential heaviness of roof and ceiling structure, and can suggest reassurances in their contest with gravity. The abundance of light available permits complete control of sun and diffusion to take its toll and still leaves respectable amounts with which to work; the efficiency of the top source can keep the expense involved within economic limitations.

Top Lighting Is Direct

In sum, the result is the removal of lighting from its recent position as a dominant factor in school design and in the learning environment. Both visually and actually this preoccupation with light has long distorted the design picture to the possible detriment of other equally important factors. Our long familiarity with side light difficulties and inadequacies has led us to accept without too much objection their obvious limitations in usefulness. In the directness of top lighting lies its basic merit and normal evolution should bring new investigations, experiences and researches that expand its uses. Windows remain as means of vision without and within, as sources of horizontal component rays for three-dimensional seeing and as a psychological escape from the enclosure effect created by the classroom.

Unilateral, bi-, tri-, quadri- or multilateral light sources all start from the perimeter of a space to do a job at the center and, thus handicapped, must yield the advantage to the internally located top source. Those who deprecate daylight as useful base their arguments on *side source* deficiencies, going overhead with their artificial answers because of the unchallenged efficiency involved.

Still, there seems to most of us inherent advantages in the use of natural means when available and there is always the need of fighting rearguard actions against those who would solve every problem with an additional encumbrance. May we lead our efforts, instead, toward the ultimate simplification of our environment through clear thinking and the employment of our skills and talents in the full use of those natural forces which have been given to us.



The most frequent direct route of sound is through open windows. In school buildings noise from the outdoors may cause serious interference with class activity.

ENGINEERING FOR SOUND CONTROL IN SCHOOL BUILDINGS



by ROBERT A. HANLE

Tectonic Associates, Somerville, New Jersey

Robert A. Hanle was graduated from Cornell University in 1944 with a degree in mechanical engineering. He served three years in the U.S. Naval Reserve and then spent five years in industry in the various fields of mechanical engineering. Mr. Hanle has been a member of the firm of Tectonic Associates for the past few years. This firm specializes in the problems of engineering related to the design of new buildings, with its main effort directed to school building engineering problems.

IN many respects the application of engineering for sound control in school buildings has been largely ignored. In the majority of cases the principles of sound engineering are employed only in the design of large auditoriums and even then only superficially. Yet the acoustics of the classroom are complex and highly important. One of the primary purposes of a classroom is to produce an atmosphere suitable for communication by means of sound. Only the branch of this science which deals in simple noise control is being applied almost universally.

Such wide application is primarily a result of the convenience, economy and simplicity in using the wide assortment of acoustic tiles and acoustic plaster which are on the market. For the purpose of noise control the extensive use of these materials provides an excellent solution, but many people and some designers have come to consider them a panacea for all acoustic problems. This is an erroneous conclusion for, as a matter of fact, their over use has often led to harmful rather than beneficial results, particularly with regard to the classroom and auditorium.

Two Aspects of the Problem

Engineering for sound control in school buildings must consider and compensate separately for each of two aspects of the problem—sound control necessary for good speaking and listening; and noise control required for physiological and psychological comfort.

The former requires conservation of sound energy produced by the speaker and limitation of interferences which tend to confuse the clarity of the speech. The latter requires control of noises which are so loud, high-pitched or sudden as to produce physical and nervous fatigue, or noises which, although perhaps barely audible, are distracting to thought. An example

of this kind of distraction is muffled speech from an adjacent room when words are only occasionally understood. Obviously the two aspects overlap to the extent that the absence of loud irrelevant noise is essential to good hearing and listening.

Sound Control for Good Speaking and Listening

Sound control for good speaking and listening dictates an entirely different approach from that required for the simple control of noise. On one hand, the primary consideration is sound conservation and limitation. On the other, the consideration is rapid deadening and dissipation. There is no doubt that even an orderly classroom or assembly group will sometimes create noises which should be deadened. However, the permanent devices which could be incorporated into the construction of the room to deaden these noises would also act to deaden the speaker's voice. Therefore, since we must design for best possible speaking and listening conditions in rooms of this type, there is no substitute for maintaining a quiet group. Background noise from other sources such as ventilating equipment, outdoors or adjacent rooms must be kept to a minimum too. The means by which this may be accomplished will be discussed further on.

Low background noise alone is not enough; there must also be adequate volume of sound for the listener. Numerous tests involving accurate measurement of speakers' voices have shown that the optimum loudness for listening is 60 to 70 decibels. This is equal to average radio volume. Difficulty results from the fact that, although the speech may be loud enough when it leaves the speaker's throat, it may not be loud enough when it reaches the ear of the listener.

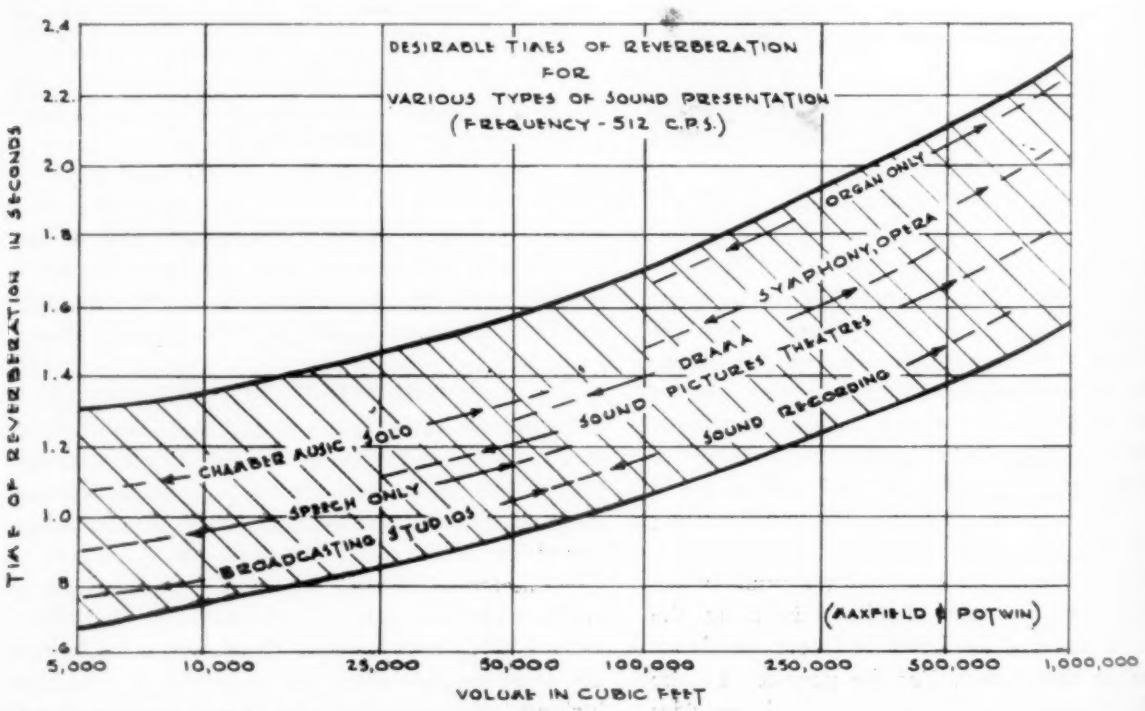
Snow Tunnel Experiment

In dead or heavily absorbent rooms a distance of 20 feet can cause a sizeable reduction in the speaker's volume. As an illustration of this, some years ago an experiment was made in a tunnel of snow 15 feet long and 7 feet high. Snow was used because it is an

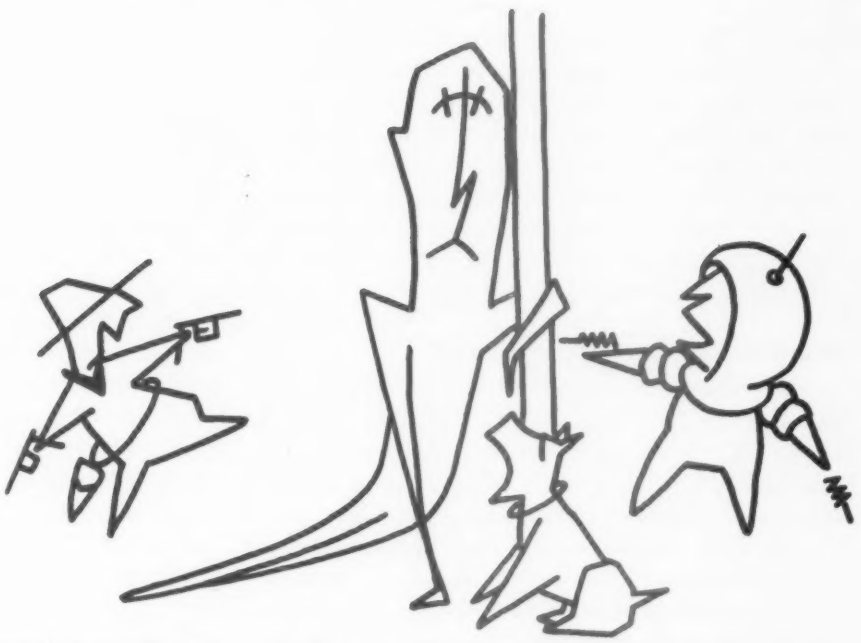
Relative Position of Familiar Noises

Decibels*	Sounds
120	Sound painful beyond this point
110	Airplane engine
100	Boiler factory
90	Heavy traffic; unmuffled truck
80	Noisy office
70	Average street noise; average radio; volume required for ease of listening in auditorium or classroom
60	Ordinary traffic
50	Average conversation
40	Quiet radio
30	Average auditorium; quiet home
20	Whisper
10	Rustle of leaves

* The term decibel is a logarithmic expression of amount of energy in the sound. It is important to note that because the scale is logarithmic a 40 db. sound is not twice as great as a 20 db. sound but 100 times as great.



This chart shows the variation of optimum reverberation time with room volume. Optical reverberation time varies with the primary purpose for which a room is designed and with the room's volume.



Loud, sudden or high-pitched noises produce physical and nervous fatigue. Control of these noises will result in physiological and psychological comfort.

ideal sound absorbent being filled with tiny air passages which trap and dissipate sound energy. In this experiment an observer at one end of the tunnel could not hear the talking of a person at the other end.

Many measurements have been taken of speech volumes in auditoriums. For a small auditorium the average level for six speakers was taken at 50.7 decibels, but measurements of eight different speakers in a large auditorium showed an average level of 45.7 decibels. Thus, while the intensity level in a small auditorium can be expected to be barely adequate it is not possible to assure a proper level in a large auditorium without the aid of amplification.

Another requirement for good listening and



Snow is an ideal sound absorbent, being filled with tiny air passages which trap and dissipate sound energy.

speaking conditions where medium and large rooms are involved is establishment of optimum reverberation time. Reverberation time is defined as the length of time required for a sound to decrease to one-millionth of its original intensity. To appreciate the principle involved it should be understood that sound waves travel from the source in a spherical pattern, spreading outward in a manner similar to the ripples produced in a still pond of water when a pebble is thrown in. When a wave strikes any surface it is partially absorbed by the surface and the remainder is reflected as a new spherical wave radiating outward from the point of incidence. This incidence and reflection occurs and re-occurs from one wall to the next until eventually the sound is entirely absorbed.

Absorbing Reverberations

In rooms having hard walls several hundred such reflections may occur. Since the surfaces upon which the sound wave impinges are the primary absorbers, it follows that the closer the surfaces are to each other the faster will the reflected waves impinge on the surfaces enough times to be absorbed. In other words, small rooms invariably have shorter reverberation times than large ones of the same construction. Reverberation time for any room may be shortened by the use of sound absorbing materials on the walls, ceiling, floor and other places within the room. By so doing, a greater portion of the sound wave energy is absorbed at each impingement and fewer impingements and reflections are required for dissipation of the sound.

Reverberation is both useful and detrimental. If reflected sound reaches the listener approximately $\frac{1}{15}$ of a second later than the sound coming directly from the speaker, a confusing echo results. Such an echo, combined with subsequent sounds and their echoes, will badly garble speech and make it indiscernible. However, if the time lag between direct and reflected sound is shortened to something less

than $\frac{1}{20}$ of a second, a merging of the reflected sound with the direct produces a beneficial effect.

As previously stated, substantial elimination of all reflected sound approaches the condition of the snow tunnel and causes the speech to be audible for only a very short distance from the speaker. Control of reverberation time is achieved by establishing a carefully calculated balance in the proportions of acoustically reflective and acoustically absorbent materials used on walls and ceiling within a room.

Reverberation Time Varies

Optimal reverberation time varies with the primary purpose for which the room is designed and also with the volume of the room. Experiments by Professor F. R. Watson of the University of Illinois showed that speakers, performers and musicians preferred greater reverberation in a room than did the listeners. The resulting reinforcement of sounds served to boost the confidence of the speaker or performer. It also enabled him to hear himself better and thereby to make necessary adjustments in delivery for best effect. Anyone who has had the experience of being in a heavily deadened room knows the smothering feeling it produces and the resulting urge to shout, even in close conversation, in order to be heard. A classroom designed in such a manner would surely send the teacher to the doctor in very short order with strained vocal cords.



The bathroom is a highly reverberant room. This is probably why many bashful people are not shy about singing in the bathtub.

The matter of reverberation in boosting confidence probably explains why many bashful people feel little inhibition about singing in the bathtub. The bathroom, consisting almost entirely of hard materials, is a highly reverberant room. There are several devices which can be used to produce this desired condition for the speaker, such as the complete elimination of sound absorbing materials around the stage or speaker's platform, erection of reflectors or sounding boards behind and above the speaker if the area is naturally dead, and, for the auditorium equipped with amplifying equipment, installation of a small loudspeaker directed downward toward the stage or speaker's platform.

Uniform Diffusion of Sound

Closely allied to reverberation is the matter of uniform diffusion of sound within the room. It is not uncommon to find room shapes and construction which inadvertently cause concentrations of sound at some points within the room and dead spots in others. This is common in rooms having concave curved walls or ceilings, since these reflect sound waves toward the center of their curvature, causing the focus of multiple reflections at a particular spot. It is the usual cause of the phenomenon observed in whispering galleries which, curious as it may be, is highly undesirable for rooms of normal use. There are many other forms and causes of sound interferences. Designers must be careful to avoid conditions which are inclined to produce these, for correction after construction is costly and not always satisfactory.

Proper diffusion depends on shape of the enclosure and proper arrangement of hard and soft surfaces within a room. Concave walls and ceilings should be avoided except in special cases where they are intentionally placed behind the speaker to produce controlled reinforcement. Non-parallel walls are preferable to parallel walls; this is true of floors and ceilings too. Where possible, numerous bold projecting surfaces should be worked into the design, for these are very effective in diffusion and in the production of smooth uniform hearing throughout. It may be of interest to note that very special attention is paid to diffusion in the design of radio broadcast and movie sound studios where high standards of perfection are demanded. In such rooms devices used include splayed walls and ceilings, stepped floors, wall fin projections and horizontal and vertical projections from walls and ceilings, consisting of semi-cylindrical forms of different radii which are known as polycylindrical diffusers.

Placing Acoustic Panels

Sound absorbing panels used for control of reverberation time should be placed in irregular patterns so as to produce non-uniform weakening of sound waves and hence serve further to aid diffusion. In order to affect waves reflecting from the side and end walls and horizontal surfaces, it is important that sound absorbing materials be made a part of each of these surfaces. In rooms equipped with amplification, where speakers are directed toward the rear, it is especially important to deaden the rear wall thoroughly to stop excessive reflections from this surface and to eliminate the possibility of confusing echoes.

These criteria for good speaking and listening are of importance in the school building primarily as ap-



In a classroom the teacher has little opportunity to rest her voice. Every effort must be made to conserve the teacher's speaking energy.

plied to the classroom and the auditorium. Other rooms are either variations of these or are governed by the criteria for noise control. Consider for a moment the special problems and application of the foregoing principles to these two areas.

Treatment of the Classroom

The classroom is first of all an auditorium, but the program is special, for the speaker seldom changes and has little opportunity to rest his voice. The problem is really, therefore, one of maximum conservation of the teacher's speaking energy in order to avoid tiring and to assure adequate loudness for the pupil. This means very careful and limited use of sound absorbing materials.

The classroom has one naturally sound absorbing surface, the floor. This is true because it is substantially covered with pupils whose clothing is highly sound absorbing. One wall is usually almost filled with windows, wall cabinets, etc. These cause it to be a good reflecting wall, and the remaining three walls probably have large chalkboards which are a hard and reflective material.

From the viewpoint of reverberation, the room is not bad, and probably does not need the addition of much acoustically absorbing material for total correction. The position of this material is important. The ceiling is a poor place since the parallel floor is sound absorbing; if at all, only the border should be treated. The end wall behind the teacher should be reflective to reinforce the teacher's voice and to help avoid the feeling of having to shout; the opposite end wall might cause an echo and is a useful place for sound absorbing material. The corridor wall is also a good place for a soft material since it will offset the hard window wall and help to avoid "standing waves" or spot concentrations of sound. In any event, the ceiling over the teacher and at least the center portion of the ceiling over the class should be hard plaster or other hard material which will produce speech reinforcement.

Diffusion is more difficult to attain since other considerations of architecture, primarily cost, usually yield the solution of rectangular shape as best. Even with the rectangular shape, diffusion can be improved if the acoustically absorbing materials are distributed on the walls in irregular patterns. In addition, it may be possible to break the parallelisms of the walls to a degree by such tricks as setting chalkboards at a slightly reclining angle.

Of course, a change in shape is the best way to insure good diffusion; one way would be to splay the corridor or window wall. Probably only with a single-loaded corridor school could the splayed corridor wall be used because of the irregularly shaped corridor which results. As a single loaded corridor it might also produce a better solution for corridor circulation by placing doors out of the way. Double loaded corridors could have splayed window walls and straight corridors. A pitched ceiling, such as usually results from the use of a clerestory, is also beneficial. A combination of splayed wall and pitched ceiling should produce very good acoustics for the classroom.

The Mistreated Auditorium

The auditorium is one room of the building not usually neglected for want of consideration of the problems of sound control, although it is frequently mistreated. Here the sound energy of the speaker must be conserved because of the large volume of

the room. The problems of echoes and uneven distribution are acute. The treatment is not as simple as for the classroom, for any auditorium will have satisfactory acoustics when completely filled. When empty or partially filled the reverberation time is always too great and echoes result. The solution of this problem depends entirely upon the skillful use of sound absorbing material.

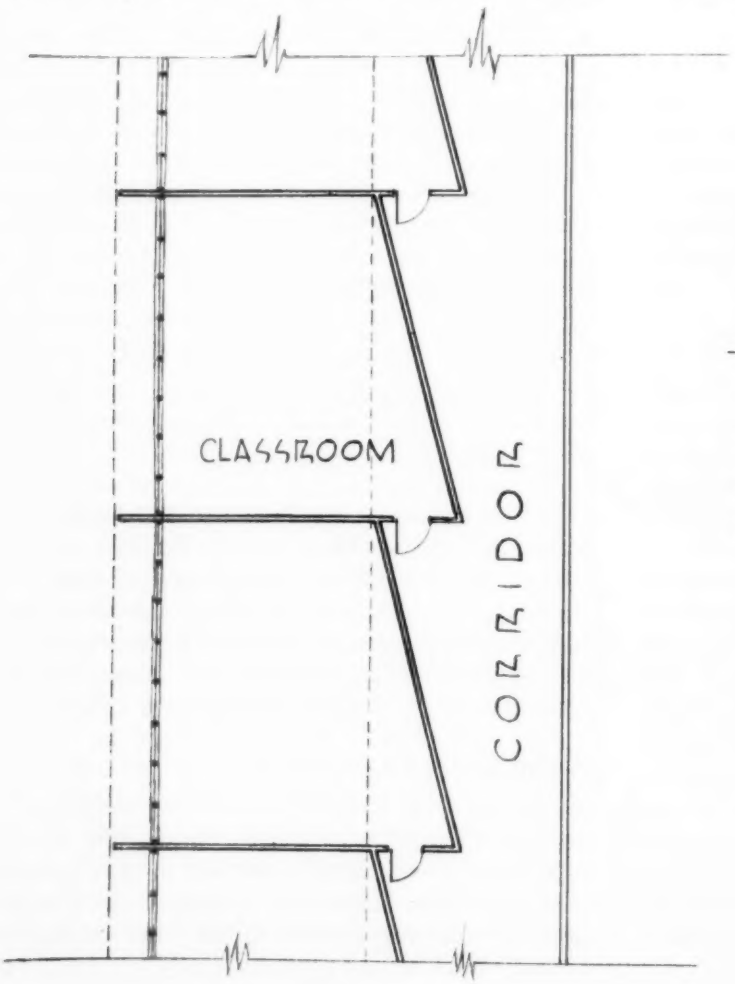
Diffusion and elimination of interference are obtained by the use of splayed or stepped walls which open the room at the rear. (The ceiling should be similarly stepped or graduated.) Bold fins projecting from side walls are beneficial where they can be worked into the design architecturally. The rear wall should not be concave but flat or convex and heavily treated with absorbing material to avoid echoes. The center portion of the ceiling should be hard, but a border of acoustically absorbent material may be used effectively. Here again the acoustic material should be irregularly distributed throughout the room as an aid to diffusion.

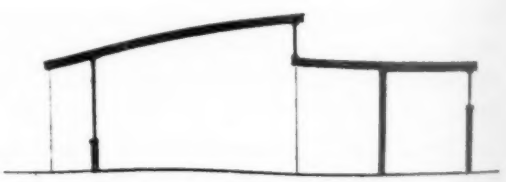
Balconies produce difficult listening conditions for those seated under them. The ceiling under a balcony should pitch toward the floor and not follow the upward sloping balcony floor. This will aid in reflecting the already weak sound in the direction of the listeners. Obviously the ceiling under a balcony should not be treated with acoustically deadening materials.

Engineering for Control of Noise

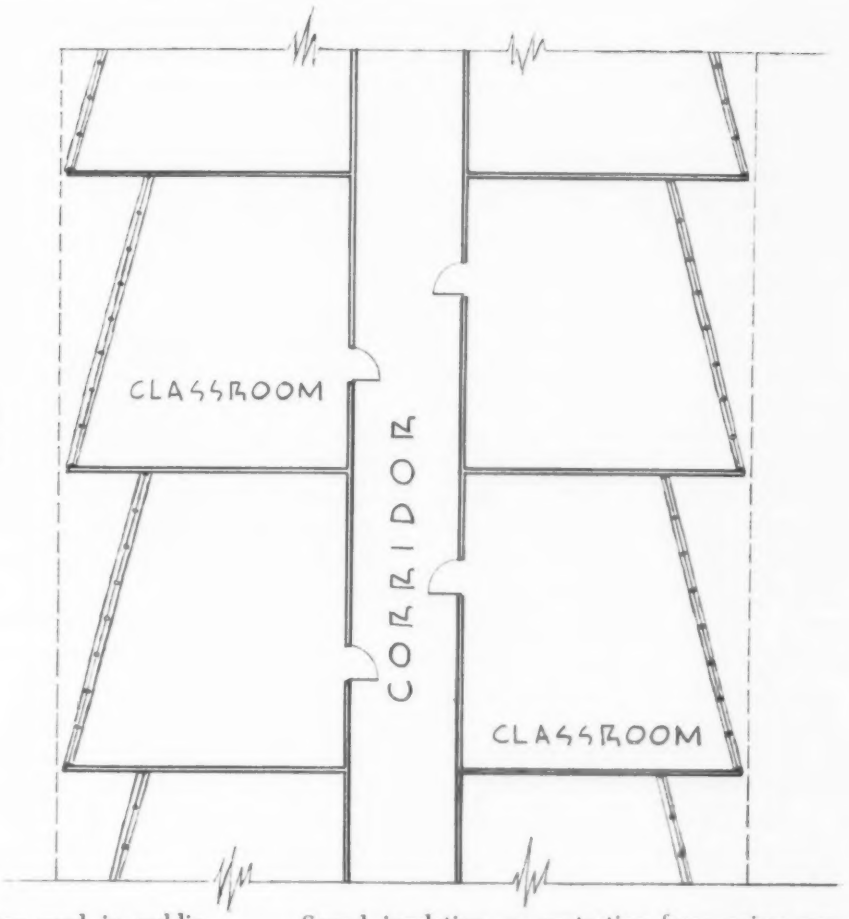
Control of discomforting or distracting noise may be accomplished in different ways depending on the listener's relationship to the source. If the noises are generated in the same room with the listener and hearing is not of primary importance, as in the case of cafeterias or gymnasiums, the room should be made as dead as possible by means of sound absorbing materials. If noise comes from another source, the room in which the listener is located must be insulated to shut out as much of the noise as possible.

The most common sound deadening or sound absorbing materials are: perforated acoustic tile made from vegetable fiber or asbestos fiber; fiberglas blankets behind perforated metal tile or some other perforated material; and acoustic plaster, which is a rough porous material having the appearance of stucco or papier-mâché. Draperies, curtains and similar porous materials are excellent sound absorbers. Unfortunately, the porous cellular nature of good sound absorbers makes them dirt catchers too and poor in strength.





Improved acoustic conditions within a classroom can be obtained by the use of splayed or stepped walls which open the room at the rear. The ceiling should be similarly stepped or graduated.



This is a scheme for a double loaded corridor in which a stepped wall is used for the classrooms. Bold fins projecting from side walls are beneficial where they can be worked into the final design.

Consequently, they are almost never used in public buildings where they are likely to be touched frequently or exposed to heavy dirt. The best location is the ceiling and high sidewalls.

For kitchens the problem is quite difficult since, even with the use of perforated metal absorbers with surfaces that can be wiped, the soft blanket backing will absorb grease and become a source of rancid odors. Some floor materials are better deadeners than others, but none are very good. The differences here are small and make the floor a poor place to regard as a deadening agent.

Noise producing equipment within a room can be deadened by isolating the equipment or floating it on an absorbent blanket. A typewriter, for instance, produces noise both by the striking of the type against the roll and originating vibrations to the air and by bumping of the carriage against the frame. The latter is normally transmitted through the desk to the floor which vibrates somewhat in the manner of a drum head. Striking of the type, which immediately produces a sound disturbance in the air, cannot be isolated but merely deadened (noiseless typewriters do effectively reduce the degree of this noise), but the bumping of the carriage can be substantially reduced by the simple expedient of placing a felt pad under the machine.

Sound insulation, or protection from noises produced outside a room, can be accomplished in many ways. For any one room usually all are employed where possible. Careful architectural planning is the most effective and usually the most economical way to accomplish this. Quiet rooms such as classrooms, libraries, lecture rooms, auditorium, etc., should be kept away from shops, the gymnasium and other noise makers. The music room should not be near shops or gym nor should it be near classrooms or the library. In elementary schools the playground should be located as far as possible from the opening windows of quiet rooms.

How Noise Is Carried

Noise is carried from one space to another by two general routes: (1) directly from the source through air to the listener—this of course depends on the free passage of sound waves through air passages, cracks, windows or through porous materials; (2) by those portions of structure which are set into vibration by sound waves in air and thus originate sound waves of their own—this does not require uninterrupted air passage from speaker to listener and is typical of how noises are heard from an adjacent room through a party wall.

In considering these routes it is clear that dead-

ening of a noise within a room by means of acoustical absorbers may not necessarily reduce or affect its ability to be carried to another room. It is a fact which, when not realized, results in a complete misapplication of sound absorbing materials.

The most frequent direct route of sound is through open windows. Open windows of adjacent classrooms can almost completely nullify the insulating effect of the party wall, although an extension of the wall several feet outside the edge of the building can reduce this nuisance. For schools where playgrounds are directly outside classrooms, approximately two months in the spring and two months in the fall are periods of combating outside noises or suffering the equally bad effects of poor ventilation.

This is an important argument for air conditioning a school since it will permit the use of non-opening window sash. There is some needless suffering from this source. Many schools have well-designed ventilating systems to supply large amounts of outside air sufficient for year round ventilation. These are often ignored in favor of the psychological effect of the open window or are unused except for heating.

Other Direct Routes of Noise

Other direct routes of noise are through ventilating ducts which serve several rooms, and through corridors which in effect are also large ducts. For each of these the treatment is the same. First, avoid locating quiet and noisy rooms in the same section. Second, cause deadening of sound with heavy applications of absorbing materials. In the case of ventilating ducts deadening will also reduce fan and moving air noises originating from the ventilating system. Even a porous cinder block partition which is only lightly painted will pass air and, consequently, allow transmission of sounds directly.

Reduction of noise transmission through the structure is accomplished by care in details of construction. In general, massive partitions supported solidly on massive floors are good insurance against transmitted noise. They usually cost more than other types of construction too. As previously mentioned, a cinder block wall lightly painted does not meet minimum requirements for sound insulation. The same wall with a heavy sealing coat of paint is just adequate. If coated with a layer of hard plaster on each side, there is quite good insulation. A single stud partition is not adequate, but two stud walls separated by an air space are satisfactory.

Impact Is Another Matter

While massive floors will not retransmit air-borne sound, impact is another matter. Footsteps, moving furniture, etc. can best be reduced by resilient floor coverings. True, these floor coverings are not good absorbers of air-borne sounds but they yield enough on the heavy impact of feet and furniture to be effective in this respect. Radios, pianos, typewriters, etc. can be isolated by placing felt or similar pads under them to break direct contact with the building structure. In special cases, the entire floor may be separated from the structure by means of a resilient felt or fiber membrane.



When typing the striking of the type, which immediately produces a sound disturbance in the air, cannot be isolated but can be deadened. The bumping of the carriage will be substantially reduced by placing padding under the machine.

TOILET PROVISIONS IN ELEMENTARY SCHOOLS



by HUGH W. HIATT

Architect, Berkeley, California

Mr. Hiatt graduated from the University of Kansas with a B.S. in Architectural Engineering. From 1935 until 1942 he was employed by Burns and McDonnell, Consulting Engineers, Kansas City. From 1942 until 1946 Mr. Hiatt served with the U.S. Navy. He became a licensed architect in California in 1948. Since 1949 Mr. Hiatt has been with the Bureau of Architecture, Department of Public Works, San Francisco. He has assisted in directing and coordinating the work of private architects engaged in designing about 30 new schools for the San Francisco Unified School District.

THIS discussion of toilet provisions for elementary schools may best be considered in four parts: individual toilet rooms for primary grades; group toilet rooms; design details; and adult facilities.

INDIVIDUAL TOILET FACILITIES

The trend towards the individual toilet facility for classrooms for younger children requires that the school architect give careful consideration to the basic design requirements for such facilities. Careful thought and consideration must also be given to determining the grades for which such facilities will be supplied, since individual toilets are generally more expensive than group facilities.

The basic requirements for individual toilet facilities for the primary grades may be stated as:

1. Provision for natural light and ventilation.
2. Ease of access from classroom and play yard.
3. Ease of supervision.
4. Economy of layout.

Light and Ventilation

Natural light is highly desirable for toilet rooms and adequate ventilation is a necessity. Most building codes require either natural ventilation by means of louvers or window vents or by mechanical means. Natural ventilation is preferable provided it is adequate. If there is any question of the adequacy of the natural ventilation, fans should be included to insure positive ventilation to keep toilet rooms fresh and clean smelling. The original cost and maintenance of a fan is an item of expense that must be given proper attention, of course.

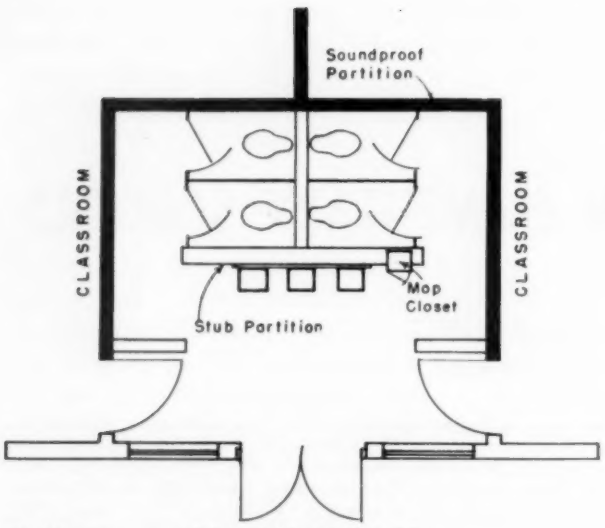
A location on an outside window wall is preferable to an inside location where skylights must be provided to give natural light. Toilets should not be situated within inside cubicles without natural light because of the possibility that the room may be left in darkness during a failure of the electric current.

Ease of Access from Classroom and Play Yard

To be most convenient, pupil toilet rooms should be located adjacent to the classroom but it is preferable that the toilet compartments should not open directly from the classroom. Toilet facilities should also be directly accessible from the play yard so that the children may have access to the facilities without the necessity of passing through the classroom during recess and lunch periods. For the kindergarten direct access from the yard is not so urgent since, in most cases, kindergarten recess periods are short and the children are not in the yard during the lunch period.

Economy in planning will usually dictate that toilet facilities be planned for two classrooms with the facilities placed between the classrooms. One solution which has proven very satisfactory is to locate the toilets off a connecting corridor between the two classrooms. Lavatories can be located on the inner wall of the passage between openings to the toilet area, while the door to the play area is on the opposite, or exterior, wall.

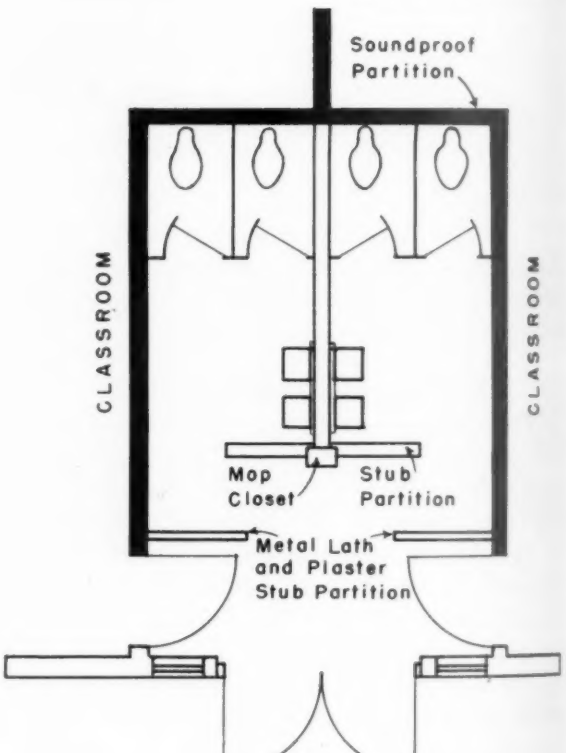
All partitions are kept low, not over 4 to 5 feet high, so that the teacher can easily supervise the entire room. The low partitions also open up the entire area to natural light and ventilation by means of windows beside and above the door. The layout must be carefully planned with baffles in the proper location to in-



PLAN No. 1 - AREA 210.49 SQ. FT.

This and the four accompanying plans are suggested toilet room layouts prepared by the Bureau of Architecture, Department of Public Works, City of San Francisco.

These plans were prepared for the assistance of private architects preparing plans for elementary schools to be constructed under the 1948 School Bond Issue for the City of San Francisco.



PLAN No. 2 - AREA 212.94 SQ. FT.

sure screening of the toilet stalls from direct view, both from the yard and the classroom.

Ease of Supervision

It is desirable for the teacher to be able to supervise toilet room activities without leaving her classroom. Glass should be provided in the doors to the washing area to permit the teacher to view most of the toilet room. In the layout described above the teacher can, by merely stepping through the doors to the toilet room, instantly supervise the entire room over the low dividing partitions. A glazed door and sidelights permit the teacher to maintain general supervision of toilet room activities from the play area.

Economy of Layout

Economy means, of course, securing the best possible layout for the least possible amount of money. For economy in utilization of facilities it is desirable to plan the toilet facilities for use by two classrooms as described above. In most cases this will allow a reduction in the number of plumbing fixtures below that required for individual toilets in each classroom. This merging of facilities also makes for economy in plumbing since water and waste lines need serve only one location between two classrooms. If classroom sinks and drinking fountains are located on walls adjoining this plumbing core, further savings can be effected.

For economy in building construction it is preferable to have the toilets between the classrooms and within the main building line. This will minimize exterior breaks and protuberances and will help to keep costs down.

GROUP TOILET FACILITIES

The basic requirements for group type facilities usually planned for 4th, 5th and 6th grade pupils differ only slightly from the lower grades. Basically they are:

1. Provision for natural light and ventilation.
2. Ease of supervision.
3. Economy of layout.

Natural Light and Ventilation

Natural light and ventilation for group toilets are a necessity. Under no consideration should these facilities be located in an inside room without natural light. Light and ventilation should be provided by means of windows, if possible. Skylights are sometimes acceptable if there is no other solution. Careful consideration should be given to the orientation of the room and the relation to the prevailing winds. If there

is any doubt as to the adequacy of the natural ventilation, it should be supplemented either by gravity roof ventilators or by exhaust fans.

Ease of Control

For the convenience of the student and easy supervision by the teacher, it is only logical to locate the group toilet facility as close as possible to the center of the classrooms it serves. Usually a location in or just adjoining the main corridor or passageway will best serve this purpose. Locations in basements, courts or other out-of-the-way places should be avoided. In multi-story buildings it is usually desirable to have boys' and girls' toilets on each floor. This will avoid the necessity of children going from one floor to another for toilet facilities and will materially aid the teacher in maintaining control.

If possible, it is sometimes good to locate one set of group toilets so that direct access from the play yard is provided. Children find these facilities convenient to use during lunch and recess periods and it is easy for the teacher who is supervising the play yard also to supervise the toilet room. If the play yard is to be used on Saturdays or after school hours with only nominal supervision, the doors from the toilet room into the building can be locked and the facilities will be fully available for use by children without the necessity of opening the building proper.

Economy in Location and Layout

Economical planning requires that toilet facilities be grouped where possible to cut down the required length of water, sewer and vent lines. However, it is usually considered desirable to locate the boys' and girls' toilets some distance apart. This conflict can sometimes be overcome by placing the toilet rooms back-to-back or side-by-side but with the entrances on opposite sides. In multi-story buildings, it is usually possible to "stack" the toilet rooms for maximum economy but still separate the boys and girls on each floor.

In addition to the "main" group facilities certain other toilets will probably be desired. If the school contains an auditorium, multi-purpose room or cafeteria, or any combination of these spaces, they are quite apt to be at some distance from the main toilet room and should have toilet facilities close at hand. In addition, lavatories for hand washing should be easily accessible just before entering the cafeteria to promote handwashing before eating. In figuring the correct ratio of toilets to students these toilet rooms should be included along with the group toilets.



Group toilet room of the Juan de Anza Elementary School in San Francisco. Architects are Hertzka and Knowles.

DESIGN DETAILS

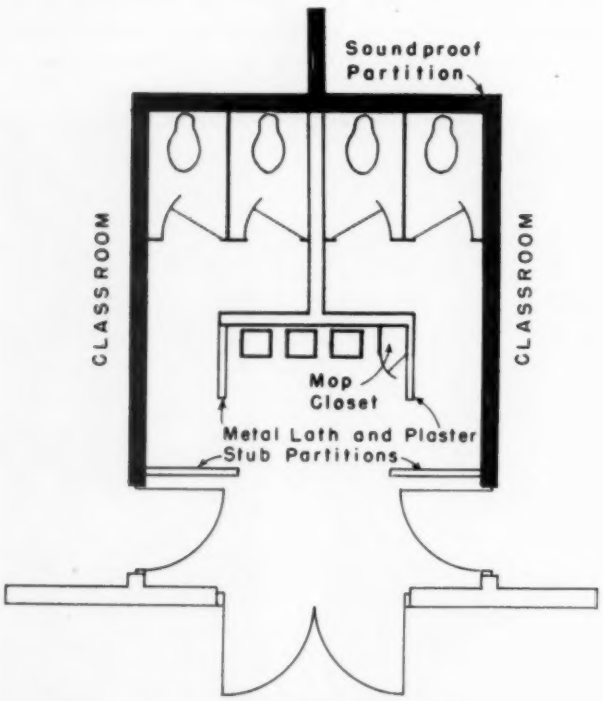
Design details of the toilet rooms must be given just as much thought and attention as details of the classrooms. Finishes must be durable to withstand the hard usage to which they will be subjected. Fixtures and fittings should be of the highest quality. It is false economy to use anything but the best grades of plumbing fixtures and the best grade of pipe and fittings.

Toilets should be sized for the user. Baby and junior size fixtures are called for in the kindergarten and first and second grades. These fixtures, of course, must be floor mounted, but for standard size fixtures used for upper grades and adult toilets consideration should be given to wall-hung models which make for easier floor cleaning. Flush valve toilets are preferred

to the tank type since maintenance is less and the possibility of damage by vandalism is not as great.

Stalls of Durable Material

Toilet stalls should be of a durable material which will not rust or deteriorate and which is easily cleaned. Marble is one of the best possible materials and will more than pay for itself over the years in reduced maintenance costs. Metal partitions with porcelain or baked enamel finish are good. Other cheaper and less permanent materials should be avoided. All stalls should be provided with doors which can be either flush wood or metal. The height of the stalls should be varied to suit the age group served.



Third suggested plan prepared for architects of San Francisco schools.

Toilet paper holders and a hook on the door should be provided in each stall. For intermediate pupils and adults a shelf in the stall on which books or other articles can be placed is desirable. It is usually good practice to provide one toilet for every 100 boys and for every 35 to 45 girls. Local codes should be consulted to determine the exact ratio.

Urinals should be provided in the boys' toilets for the second grade and above. The floor type is usually preferred although the wall hung type is sometimes used. Urinals and toilets should be of vitrified china. One urinal is usually provided for every 30 boys.

Lavatory Facilities

Lavatories may be of enamelled cast iron. A 14-inch by 14-inch size is adequate for individual classroom toilet facilities. For upper grades and for adults a standard size is usually provided. Mixing valves, supplying tempered water at 110 to 115 degrees, are desirable in all student toilet rooms. Hot and cold water is commonly supplied to adult lavatories. Self-closing faucets on all student lavatories will lessen the danger of running faucets and possible overflow.

Liquid soap should be provided at each lavatory. In large group toilets a system using a central supply tank piped to each lavatory is sometimes used. For smaller toilets an individual dispenser is conveniently mounted in the right-hand opening in the lavatory opposite the tempered water faucet. A paper towel dispenser may be provided for each two or three lavatories. A waste receptacle is commonly provided as part of the equipment.

A shelf of substantial size in student toilet rooms is very useful for depositing books and other articles. The shelf may be of tile recessed in the wall, marble, stainless steel or other durable material. Theft proof mirrors should be installed either over lavatories or the book shelf.

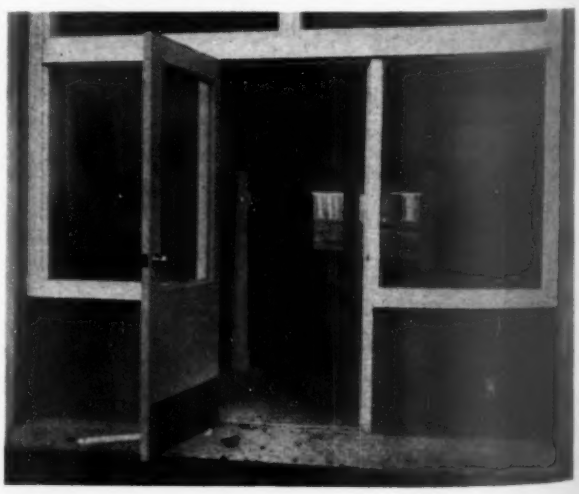
A metal locker where the custodian can keep a few items of cleaning equipment will help to promote cleanliness in the toilet room.

Walls and Floors

Wall and floor finishes should be durable and easily cleaned. A glazed ceramic tile wainscot up to the toilet stall height will more than pay for itself in ease of cleaning and lowered maintenance costs. Similarly, a non-slip ceramic tile floor is well worth the money it costs. Walls and ceilings should be cement plaster with gloss enamel finish. All trim should be painted with a good grade of gloss enamel.

Floors should slope to floor drains. In boys' toilets with floor type urinals the drain can be omitted and

Kindergarten toilet room (exterior) of the Lakeshore Elementary School, San Francisco. Clarence Mayhew, architect.





Kindergarten toilet room of the Lakeshore Elementary School, Clarence Mayhew, architect. Construction of the building was not yet completed when photograph was taken.

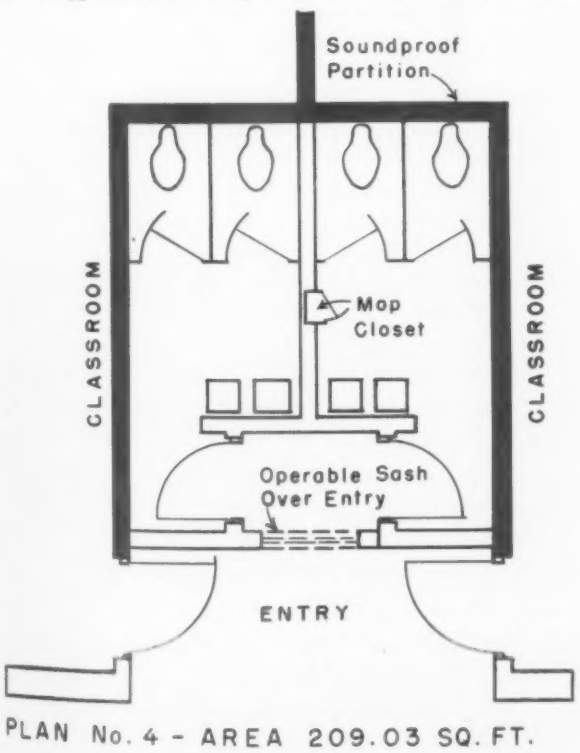
the floor sloped to the urinal. Where toilet rooms are above finished rooms, a waterproof membrane should be installed between the finish floor and the structural slab. A hose bibb should be provided in each toilet room for use in washing down the floors.

Doors for the Toilet Rooms

Toilet room doors should be push-pull in operation and equipped with closers. Floor hinges have been found to be very satisfactory and should be given consideration. Dead locks, operable by thumb latch from the inside and by key from the outside at all times, should be installed on the doors. In the case of toilet rooms with two sets of doors, one of which opens to the exterior, the door to the corridor should have a dead lock operable by key from both sides. The exterior door would then have a dead lock operated by thumb latch on the inside. This will prevent anyone from being locked in inadvertently.

Where toilet rooms serve a large number of children it is considered good practice to provide "in" and "out" doors. This will help materially to control traffic and will lessen the degree of confusion sometimes encountered at toilet rooms. Door hardware and light switches should be mounted at a convenient height for the age group using the toilet room.

Fourth suggested toilet room plan for San Francisco's new schools.



PLAN No. 4 - AREA 209.03 SQ. FT.

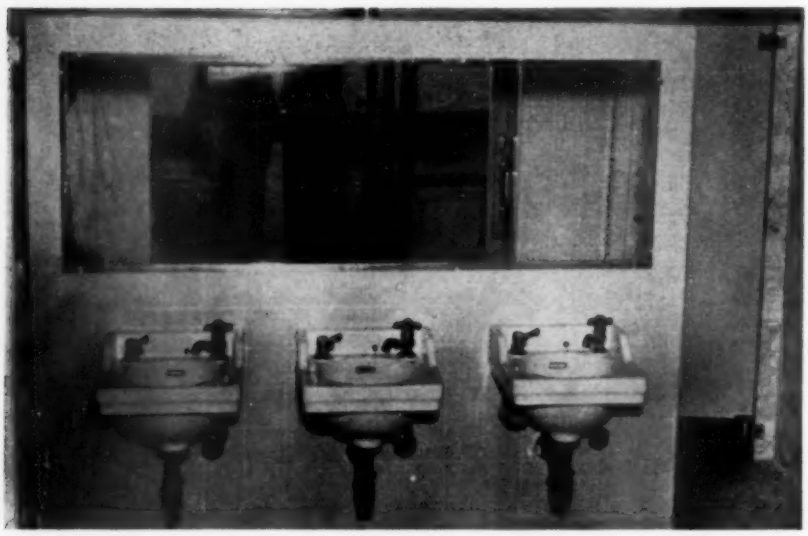
ADULT FACILITIES

Adult toilet facilities for teachers, custodial help and general public will be required at proper locations throughout the elementary school.

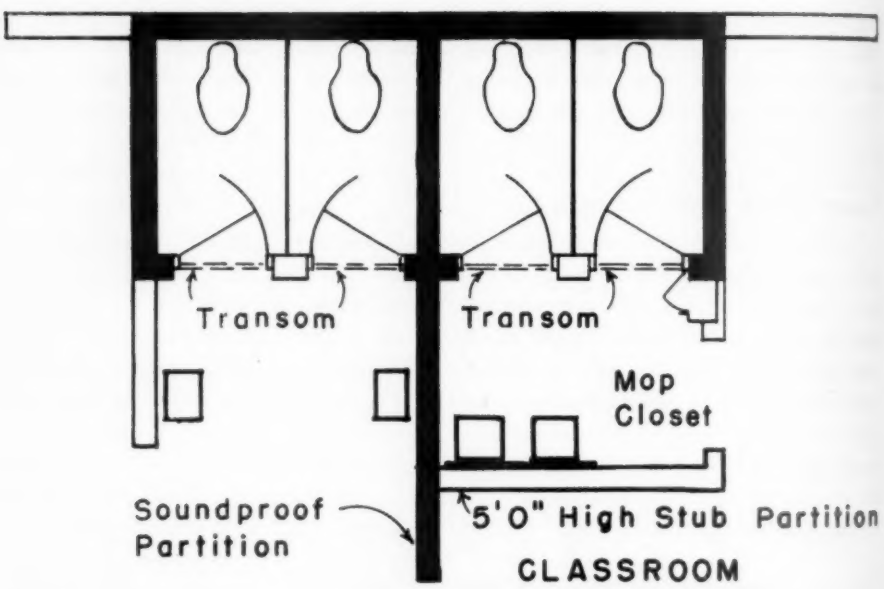
Teachers' toilets should be combined with a small lounge or rest room furnished with a cot and chairs. A minimum of two toilets and lavatories should be provided. For the larger spread-out type of school or for schools on two or more floors, additional toilet rooms should be considered so that facilities will be convenient to all teachers without excessive travel. If it is anticipated that some of the teachers will be men duplicate facilities must, of course, be provided for them. Teachers' toilets and rest rooms should be provided with natural light and ventilation, if at all possible.

Public toilet rooms should be provided in the vicinity of the auditorium or all-purpose room or other areas which will be open to the general public. In many instances these facilities can be so located that they are convenient for use by the administrative staff.

Toilet and locker room facilities should be provided for the custodial staff. These rooms should be as well lighted and ventilated as any other toilet rooms in the building. Under no circumstances should they



Primary toilet room of the Juan de Anza Elementary School in San Francisco, California. Hertzka and Knowles, architects.



PLAN No. 5 – AREA 58.02 SQ. FT.

Fifth of a group of suggested toilet room arrangements for elementary schools, prepared by the Bureau of Architecture, Department of Public Works, City of San Francisco.

be placed in a dark corner off the boiler room without proper light or ventilation as so often is the case. Fixtures and finishes should also be the same as in other toilet rooms.

Requirements for Kitchen Help

In planning the kitchen and cafeteria it is usually good practice to provide a small locker and toilet room adjacent to the kitchen for the kitchen workers. The locker room should be large enough to provide locker and dressing space for the number of employees in the kitchen. One lavatory and toilet is all that is required for the average size kitchen. Help in most cases will be all female so that only one toilet room will be required.

Consideration should be given to providing the principal with a private toilet. These facilities will not only be very useful for the principal, but may be used on occasion by students who may be in the principal's office for discipline or emergency treatment of illness. If the plan includes a health or nurse's room, a private toilet should also be considered for this room.

SUGGESTIONS FOR PLUMBING AND SANITATION IN SCHOOL BUILDINGS



Henry L. Blatner Donald J. Stephens

by HENRY L. BLATNER

DONALD J. STEPHENS

The Office of Henry L. Blatner, Architect, Albany, New York

Mr. Blatner received his Bachelor of Architecture degree from the University of Pennsylvania and his Master of Architecture from Massachusetts Institute of Technology. He has been in private practice in Albany since 1946. Mr. Blatner served with the U.S. Navy as a lieutenant during World War II.

Mr. Stephens received his Bachelor of Architecture degree from Rensselaer Polytechnic Institute. He was an architectural engineer at Watervliet Arsenal from 1941 until 1944 and served with the U.S. Navy for two years. He has been associated with Henry L. Blatner since 1946.

PLUMBING and sanitation should be considered by educators and architects as an educational device as well as a necessary facility. As a component of the total environment plumbing falls into the same category as illumination, ventilation, heating and acoustics. Each of these services must be thoroughly integrated with building design and construction if comfortable and functional school buildings are to be provided.

Careful attention to allocation of space and logical use of sanitary facilities as an educational device is most important during formulation of the educational program. Generally accepted is the theory that cleanliness as a requisite to good health should be a part of the school curriculum. For economy, multiple use of sanitary facilities should receive careful attention while scheduling spaces to be constructed. For example, toilet rooms for the public and faculty need not always be separate. Offstage toilet rooms may be located to serve other uses part of the time. Many combinations are worthy of consideration.

The suggestions which follow may prove helpful as a guide in comprehensive school building planning.

Educational Program and Schedule

When formulating the educational program and room schedule:

1. Consider the sanitary facilities as an educational device for teaching cleanliness as well as a necessary physical adjunct.
2. Provide for multiple use of planned sanitary facilities when economy is required.
3. Balance advantages of various combinations of sanitary facilities against cost. Possible combinations in elementary schools include the following of which "(d)" appears most desirable as a logical balance between facility and budget.
   (a) Separate toilet room for each sex in each classroom.
   (b) Combined toilet room for both sexes in each classroom through the third grade and separate toilet room for each sex in each classroom above the third grade.
   (c) Same as combination (b) with group toilet



Girls' shower room at Junior High School No. Two, Trenton, New Jersey, Micklewright and Mountford, architects. There are provisions for single and gang showers and a skylight for natural light.

facilities for each sex above the third grade.

(d) A kindergarten toilet room and one combined toilet room for each two classrooms through the third grade with group toilet facilities for each sex above the third grade.

(e) Group toilet facilities for each sex for all grades above the kindergarten and first grade.

4. The choice of facilities in secondary schools becomes a definite function of the type and size of building relative to available funds. Each building should be studied separately in this respect. Combination "(b)" of the two below is the more desirable and should be adopted when possible.
   (a) One large group toilet facility for each sex on each floor.
   (b) Smaller decentralized group toilet rooms for each sex whereby shorter distance of travel and less crowding provide for desirable conditions.
5. Consider handwashing in connection with school lunch programs as an important aid to personal health.
6. Consider water and drainage within the elementary classroom and specialized secondary classrooms as desirable teaching devices.
7. Provide adequate shower facilities for all students who may participate actively in planned physical education. This may lead to shower facilities for at least the older elementary children as well as all high school pupils.

When selecting the site for school buildings:

1. Make detailed investigation of available water supply (including water for fire protection) and of sewage disposal possibilities.
2. Consider cost of site on the basis of developed utilities.

Preliminary Plans

When formulating preliminary plans:

1. Group the toilet rooms closely to reduce water and drainage runs and fixture connections thereto.
2. Locate toilet rooms for maximum accessibility and minimum travel.
3. Provide adequate privacy.
4. Plan for summer access to at least one toilet room per sex to serve outdoor community activity on school property when school is closed.
5. Include proper plumbing facilities for health suites, custodial areas, gymnasium, kitchen, etc.
6. Decide method of integrating plumbing lines with building construction so that easy access to piping and equipment may be afforded without undue cost.
7. Include gas distribution system, if required, for laboratories, cooking or heating apparatus. Bottled gas tanks may be buried underground for safety and appearance.
8. Provide individual shower and dressing facilities in addition to group showers for those children who wish or require personal privacy.
9. Consider a separate apartment type kitchenette for faculty use.
10. Review the proposed water supply and sewage disposal systems with all officials and agencies which must ultimately approve the systems. Obtain preliminary approval when possible.

When preparing detailed plans and specifications:

1. Follow the National Plumbing Code as the logical standard for designing plumbing and drainage systems unless local codes take precedence.
2. Simplify design wherever possible. For example, venting of drainage lines in one story buildings is often unnecessarily complicated.
3. Design storm water and roof drainage systems for less than maximum rate of rainfall unless puddling of water for short duration during heaviest rainfalls cannot be tolerated. (Almost all flat roofs will store water adequately during short periods of unusually heavy rain).
4. Run connecting storm water and sanitary drainage lines *outside* of buildings where possible in



Hedrich-Blessing

Toilet room accommodations in this elementary school by Perkins and Will, Architects-Engineers, feature two separate rooms adjoining the classroom. A sink is located between the toilet rooms.

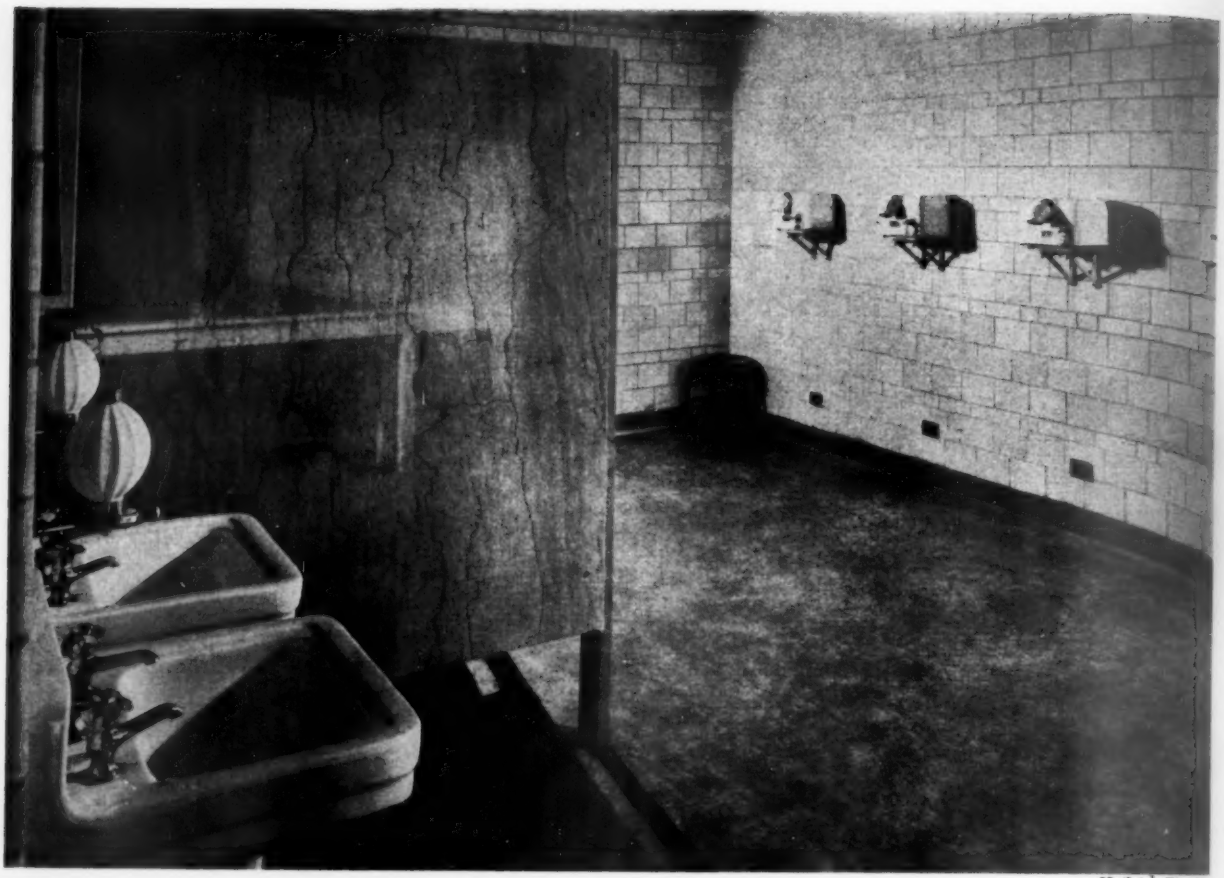
order to use clay tile in place of costlier cast iron pipe.

5. Specify durable first quality plumbing fixtures and accessories in order to minimize future maintenance and replacement. Adequate support of fixtures is essential.
6. Provide proper safeguards so that differential water pressures on plumbing fixtures will be held within reasonable tolerances (preferably 30 psi).
7. Prevent water hammer through use of sealed air chambers or pipe extensions.
8. Carefully choose piping materials for intended use to minimize corrosion, electrolysis and joint failure.
9. Insulate hot and cold water piping to prevent heat loss, sweating and freezing.
10. Specify rigid testing and balancing of all piping equipment.
11. Provide ample floor drain outlets to permit efficient cleaning of all areas where water may be used liberally without damaging floor surface.
12. Carefully locate interior and exterior fire protection equipment for maximum safety.
13. Provide exterior water outlets in sufficient number to satisfy educational needs and watering of grass and trees.
14. Include exterior drinking fountains as required by building layout.
15. Include provision for temporary water during construction to accommodate all building trades.

Supervising Construction

When supervising building construction:

1. Establish at outset of work definite procedures for testing all work at various stages of progress and at final completion. Make clear to plumbing contractor that tests will be rigidly inspected.
2. Approve shop drawings for specific parts and accessories before installation in building.
3. Pay careful attention to plumber's solution of diagrammatic layouts.



Hedrich-Blessing

Automatic hot air dryers are provided along the wall of this toilet room. A push button at the right of each dryer controls its flow of hot air.

4. Insist on proper and uniform pitching of drainage pipes.
5. Carefully inspect all material and pipe joints to insure compliance with specifications.
6. Be sure that underground piping is securely bedded and protected before backfilling of excavations begins.
7. Insist on provision for expansion and contraction (particularly where copper tubing occurs).
8. Guard against electrolysis through contact of dissimilar metals with insulating tape or fittings.
9. Do not accept plumbing fixtures or accessories not properly and securely installed or otherwise defective in operation or finish.
10. Insist on carefully placed cleanouts and draw-offs required to maintain drainage and water systems efficiently.

While the suggestions given here will not solve the plumbing and sanitation problems of all school buildings in every situation, they will doubtless serve as purposeful guides to the planner. They are offered in the interest of better school buildings for the nation.

USE OF PRECAST CONCRETE IN SCHOOL CONSTRUCTION



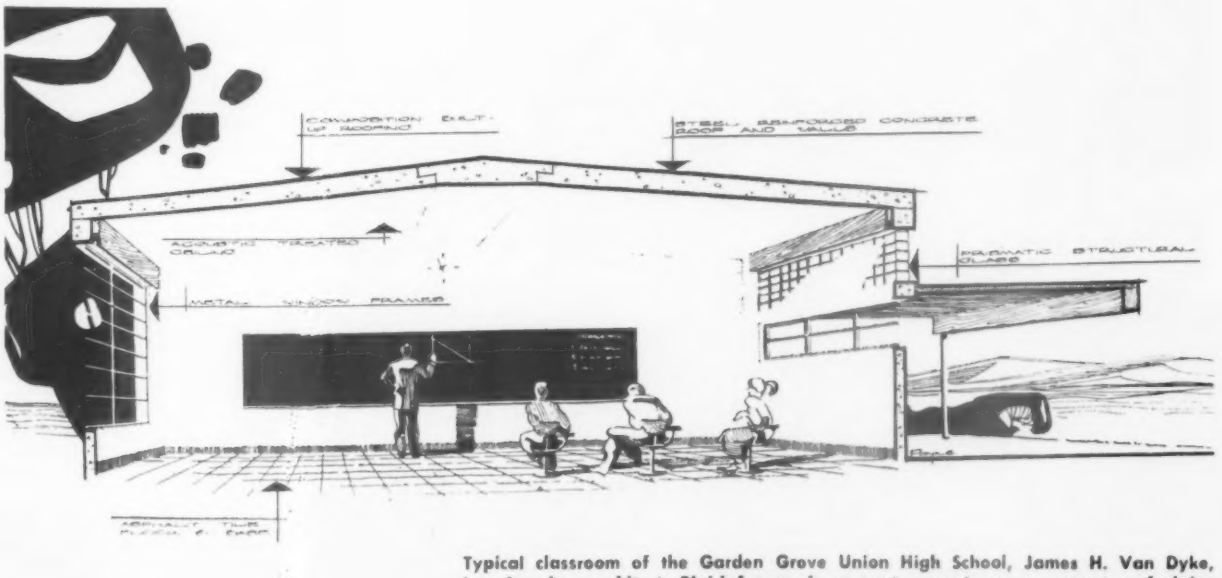
by DOYT EARLY

Architect, State of California Department of Education

Mr. Early attended Miami University in 1921–1922 and was graduated from Ohio State University with a degree in architecture in 1925. He worked in various architects' offices in Ohio and California and served in the army for three and one-half years. Mr. Early joined the California State Department of Education, School Planning, in 1929 and has been there since.

IT has been almost axiomatic since enactment of the Earthquake Safety Act in California in 1933 to construct one-story schools in wood frame, two-story in concrete. The opinion is general that there is inadequate re-use of forms for concrete to be economical in one-story schools. The desire to construct a building more durable than stucco, more fire resistant than frame, perhaps with fewer trades participating, however, has promoted a great interest in precast concrete unit construction.

In some areas of California the summer construction season is short with winter seasons as rigorous as any in the United States. Other areas are remote, far from a railroad where long hauls would be necessary for construction materials. For example, the new high school in the Tahoe-Truckee Unified District is a steel skeleton to which precast concrete units are welded. It was thought the steel could be quickly erected and the panels prepared in the Bay Area because of the lack of local aggregate. The structure was completed more easily than any typical construction would have been during the short summer season and long winters with perhaps as much as twelve feet of snow. The panels were fabricated by P. Grassi of South San Francisco. They are finished in acid treated red granite. In the fabricator's yard facilities are available for dense concrete, accelerated aging, form re-use and the extremely close tolerances that are



Typical classroom of the Garden Grove Union High School, James H. Van Dyke, Los Angeles, architect. Rigid frames in precast concrete carry precast roof slabs.

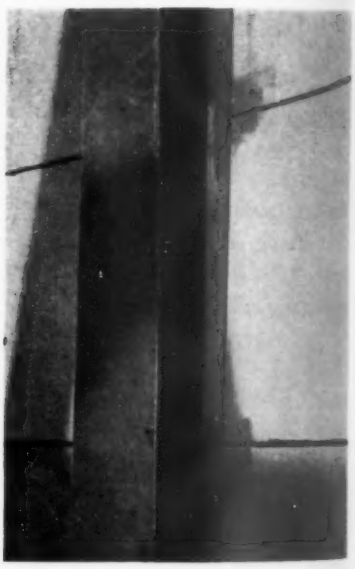


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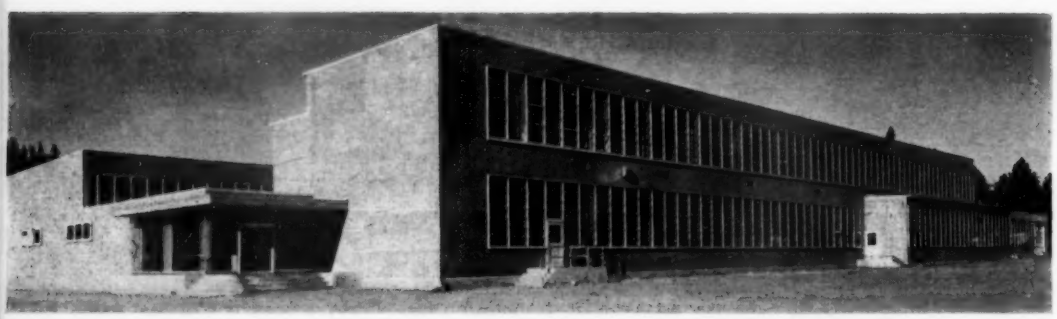
Yard of the P. Grassi Company. Panels shown here were used for the Tahoe-Truckee High School. Panels are finished in acid treated red granite.



Panels for the Tahoe-Truckee High School were transported by truck for a distance of 210 miles over the Donner Summit of the Sierras to the school site.



Construction of the Tahoe-Truckee High School consisted of a steel skeleton to which concrete units were welded. Panels were welded in the manner shown above.



Tahoe-Truckee High School, Gordon Stafford, architect. The building withstands a rigorous climate.

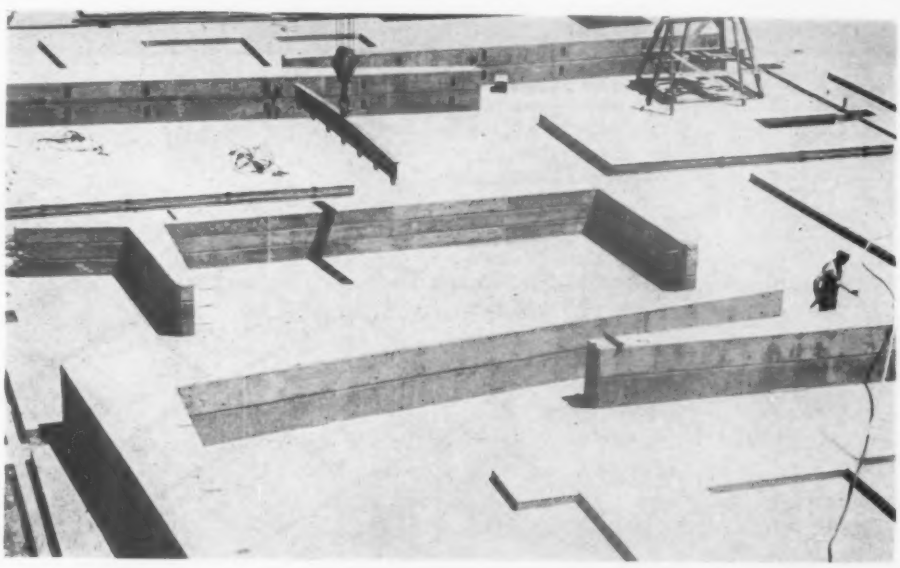
necessary for a building which will withstand a rigorous climate. Gordon Stafford was the architect.

Precast Rigid Frames in Use

Under somewhat similar conditions Frederic Barienbrock, architect, planned new buildings for the Big Pine Unified District of Inyo County. No lumber is cut in this semi-desert area beyond the Sierra Nevada mountains. No railroads traverse the area. Some lightweight aggregate is available in this land of ancient volcanic action as well as regular aggregates. It appeared the least amount of hauling could be effected through the use of precast rigid frames. Panel bracing elements provide the necessary horizontal strength for the building. Many of the panels have hollow areas to reduce weight.

Without question, the greatest use of precast panels occurs in the construction of warehouses or factories where the floor slab is poured. On this is poured the practically identical wall panels. Obviously the only form necessary is the small one around the edges. Not only may the forms be re-used, but the panels may be cast on top of each other. Columns may be separately cast or poured after the panels are tilted up into position. Actually the use of precast units is not new. In the very informative bulletin of the Portland Cement Association on "tilt-up" construction reference is made to an example constructed in 1905.

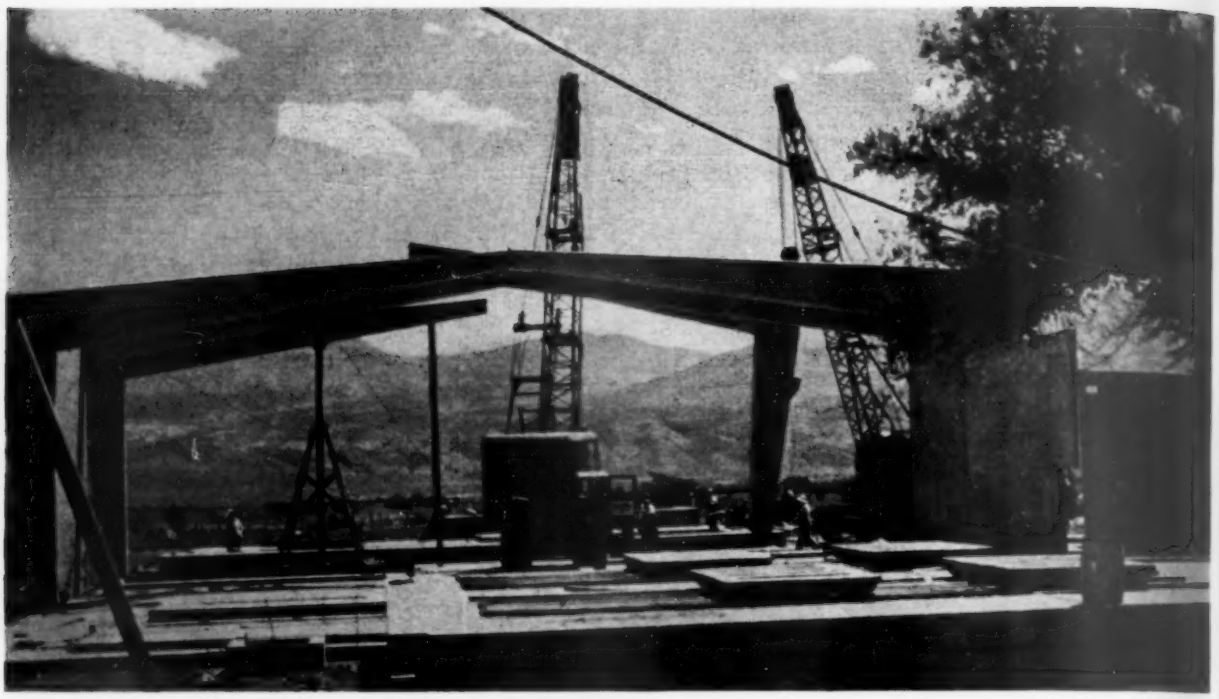
One of the characteristics of our time is the enormous advance in engineering of all kinds of construction: wood, steel, concrete. Time was when concrete construction was relatively slipshod. Nowadays, with mixes designed for specific strengths, controlled water-cement ratios, tests before use of cement, steel and cylinders of poured concrete, better placement, vibration which permits lower slump and consequent greater strengths as well as lesser shrinkage, better form work, less separation of aggregate, better curing,



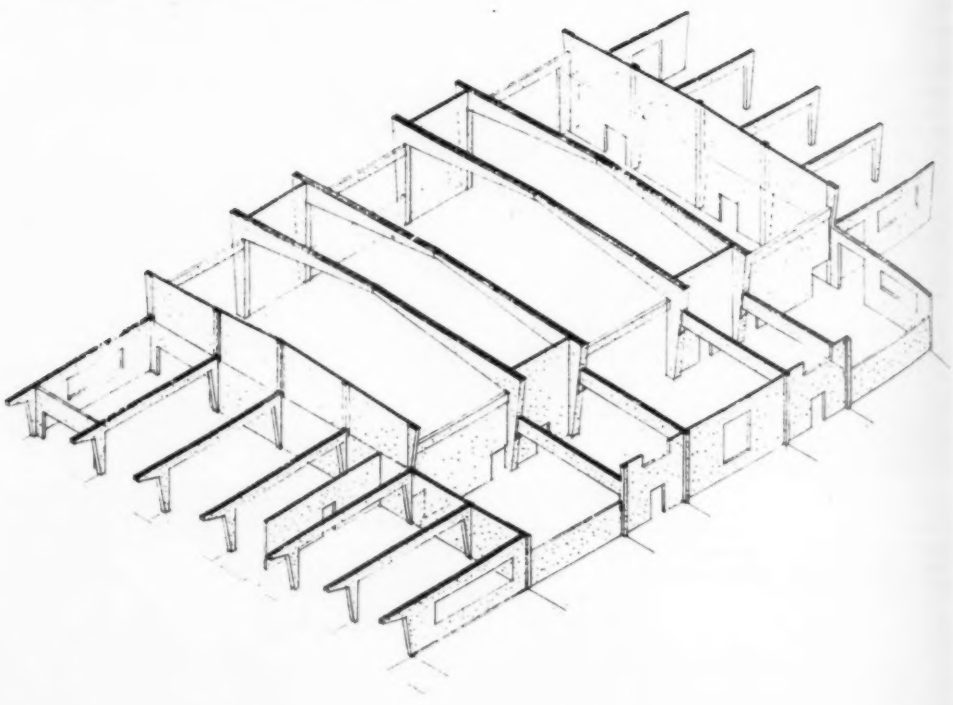
Unassembled panels used for the Big Pine School, Inyo County, Frederic Barienbrock, architect. Behind the crane pulley are two large hinged bent elements. Under the crane are typical rigid frame bents used in spanning the shop, cafeteria and home economics sections.



Shear walls connect the first two bents in place during construction of Big Pine School. Other panels are lying in the foreground.



Erection of the Big Pine gymnasium-activities building roof bents. Hollow roof slabs and entrance roof supports are piled up in the foreground.

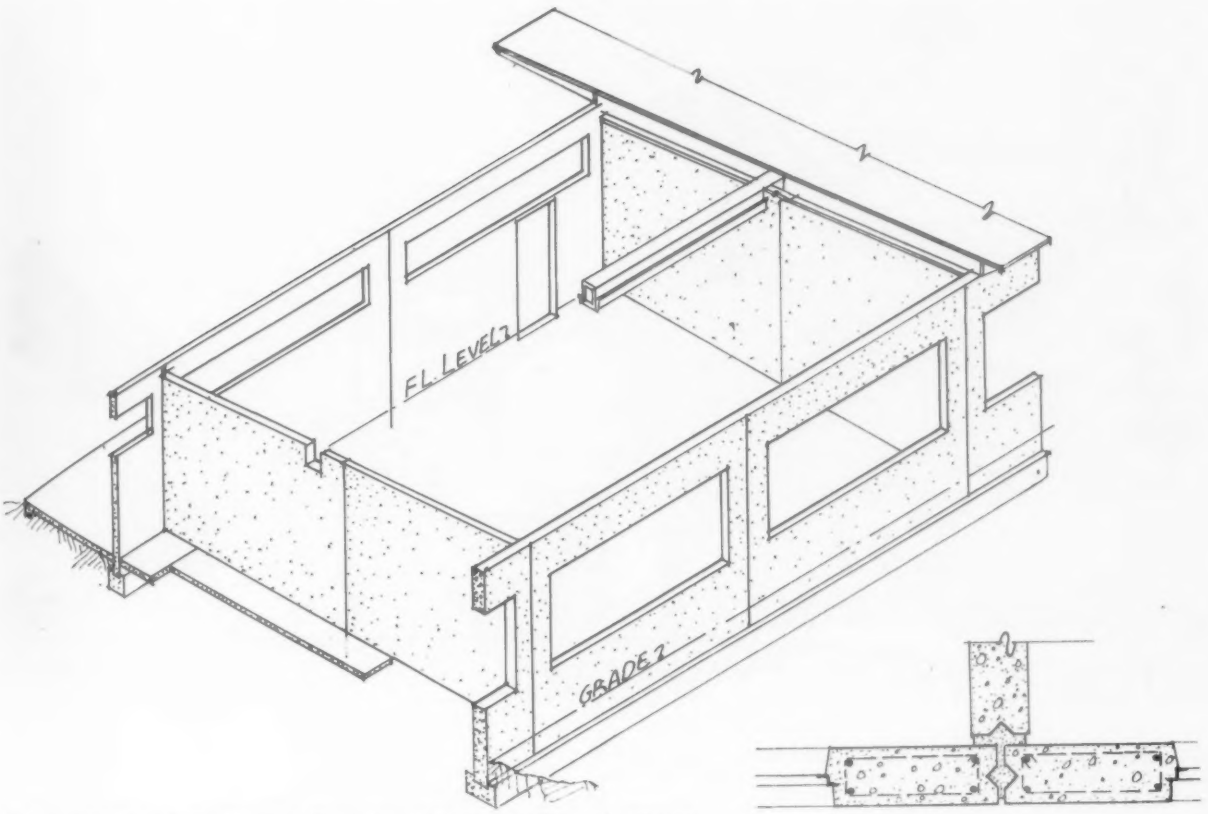


Positions of the precast panels used in the Big Pine School District activities building.

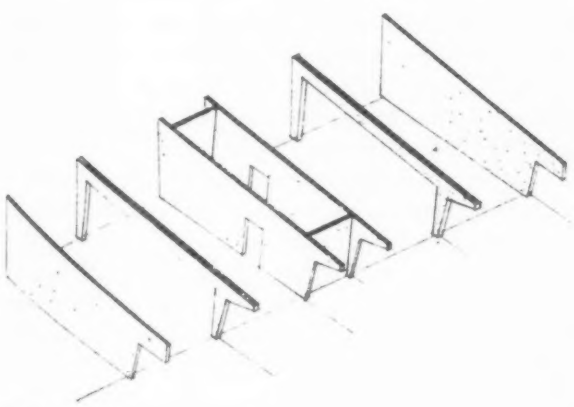
and more and better mechanical equipment for pouring and finishing, many in the construction industry are ready to pioneer further in the use of the material.

Potential for Lower Building Costs

With wages higher in the construction field than they have ever been, we are less than ever willing to accept poorer building standards. The search for lower building costs has led to simpler construction, repetitious units of construction, elimination of trim and separate finish. Precast concrete units have appeared inviting because of simplification of forms, absence of form stripping and ease of reinforcement placing. These are particularly of interest where forms, reinforcement placing and pouring or stripping are done at high levels. Since, as was mentioned above, the principal use of tilt-up construction has been in warehouse construction, it is not surprising that the meth-



In the construction of the Torrance Elementary School, Schreiber and Johnson, architects, shear keys and tension welds hold panels to the foundations.



Positions of precast concrete panels used in the Big Pine classroom building.

ods used there have influenced construction of schools.

In the Torrance School by Schreiber and Johnson, architects, because of the large window area there is a column along each vertical edge of window wall panels. The grooved edges of the panels are filled with sand and cement after erection. There are also shear keys and tension welds which hold the panels to the foundations and carry tension loads. Perhaps the most obvious criticism is the use of heavy beams over the window. These prevent the windows from extending to the ceiling as in typical school detailing. One of the most conspicuous savings is the almost complete absence of trim at doors and windows.



Rear view of the Big Pine activities building showing the shop area. Construction permits window length to ceiling with no shadow-casting beams overhead. Verticals are window mullions, not structural columns.



Construction methods employed in the Garden Grove High School, James H. Van Dyke, architect, eliminate the necessity of deep structural beams.

A logical development, paralleling schools built by other methods, is the use of rigid frames in precast concrete which carry precast roof slabs. This eliminates the necessity of deep beams. This construction method was used in the Garden Grove High School by J. H. Van Dyke, architect. In a large building the construction becomes very highly organized. The recently planned gymnasium at the Coalinga High School, Walter Wagner, architect, has panels up to 35 feet in height.

Compressive Strength of Concrete

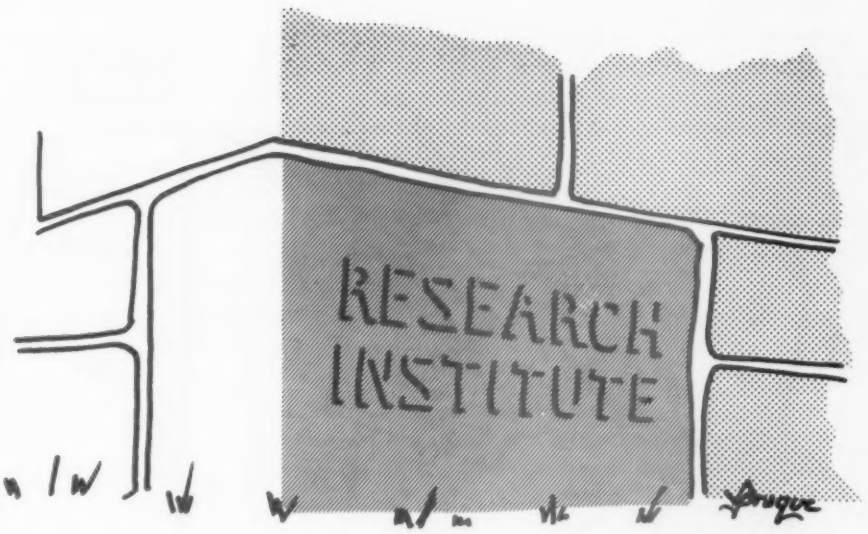
One of the interesting details of the Torrance School is the 12-inch by 16-inch pre-stressed concrete beam running longitudinally between classroom cross walls which are approximately 35 feet apart. Each of these has five wire cables consisting of seven quarter-inch wires. Two of these are hung so that, when the concrete is placed, they are catenaries. The cables are covered with paper. When hydraulic jacks stretch the cables the steel slides inside this paper sheath, permitting a greater utilization of the compressive strength of the concrete. There seems to be no reason why greater use of such beams might not be made, perhaps replacing steel or laminated wood beams.

The Basalite Company of Napa has been promoting a prefabricated unit called *Stresscrete* consisting of accurately made concrete blocks held together by steel tension members. Considerable use of this system was made by architect John Lyon Reid in the South San Francisco High School shop.

As so often happens, the relatively novel method of precast concrete construction has been exploited as a promising means to enormous cost savings. Experience is somewhat divided. Perhaps it would be fair to say that no money will be saved until not only the architect and contractor but also their staffs become familiar with the techniques involved.

What the Future May Hold

One might say the techniques are evolving. The forming of L-shaped sections, for example, has become quite complex. Close coordination must be developed between the mechanical and electric trades and the contractor who precasts the concrete. As greater development occurs in the methods of precast school construction it can be expected that lighter, airier, more durable structures will be designed.



The research institute can serve as a cornerstone for the establishment of research programs in school plant planning.

PROPOSED RESEARCH INSTITUTES IN SCHOOL PLANT PLANNING



by THEODORE L. RELLER

Professor of Education, University of California, Berkeley

Dr. Reller received his master's and doctor's degrees from the University of Pennsylvania and Yale University. After teaching and administrative experience in public schools he has held university posts, first at the University of Pennsylvania and later at the University of California. Dr. Reller has served as consultant to many state and local study commissions in education.

ONE of the outstanding characteristics of our society has been the conscious use of research in the solution of problems. When industrial concerns are evaluated, an important question is the extent to which they are employing scientific methods in seeking solutions to problems. A sizable budget devoted to research is the mark of an outstanding corporation. This promises to be even more true in the future as research is applied to a wider group of problems. In many instances in the past research has been confined largely to technical material matters. Increasingly it is being used in personnel, industrial relations and marketing problems.

The last few years have also witnessed a tremendous growth of research sponsored by government. One of the most significant developments of the Second World War period was the conducting and subsidization of research. It pertained most extensively to material matters but also was extended into the selection, education and behavior of leaders and men. Following the war years research was continued in considerable measure. More than two billion dollars of Federal moneys per year are devoted to research. Much of this research work has been done in and by various governmental agencies. A considerable part of it has been and is being conducted by universities under contract with the government. So large has the amount of this work been in some universities that there has been concern that it might permanently slant the research effort of the universities in the directions which the subsidies provide. While the atomic research program has been widely publicized and has demonstrated in large print the effort of man to advance his knowledge through the scientific method, it constitutes only one aspect of a much broader governmental research program.

Research Effort in Universities

Research effort has not been confined to corporations and governmental activities. It has long had its most fundamental base in universities and among uni-

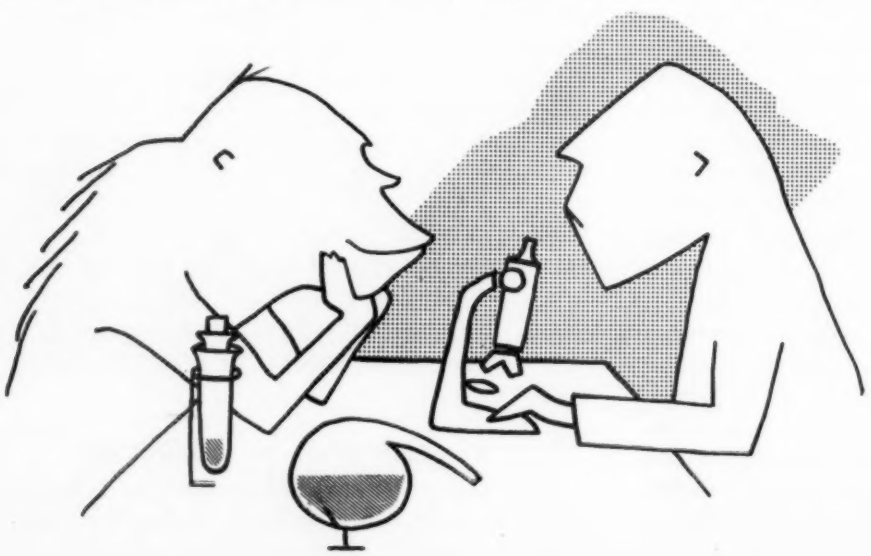


During the last few years the Federal government has sponsored a tremendous amount of research. Much of this research work is done in and by government agencies.

versity men. More recently it has gained growing recognition in this citadel. Its advance in the university has, of course, not been unrelated to grants from corporations and contracts with governmental agencies. However, universities themselves have in some instances been seeing it as an arm of their work for which, with or without foundation support, more adequate resources must be provided if the role of the university is to be effectively played.

On the Berkeley campus, as an illustration, we have recently had completed a virus laboratory at a cost of one and one-half million dollars, the primary function of which will be almost exclusively research. Obviously the benefits will spread to teaching also, but the primary justification for the investment is research. Again I was interested recently in noting that on one of the campuses of the university approximately 80 percent of the budget is for research. So we see that universities struggle to advance knowledge, to solve problems as well as to advance society through teaching and service.

Thus, our society has employed research more and more as a conscious tool for its advancement. This has been shown in industry, medicine, business, uni-



Research has become a conscious tool for the advancement of society. It is employed in an ever widening area of man's activities.

versities and government. It has been employed in an ever widening area of man's activities. It has emphasized the material, technical phases of our work but gives signs of moving more pointedly in the personnel, human, motivational areas. Perhaps of most germaneness here is the fact that it promises to be employed on a vastly greater scale in the years immediately ahead.

Research in School Plant Planning

Considering the vast strides made by research in all phases of modern life it may be a little shocking to discover the provisions made for research in the school plant field. Let us consider the provisions for and the research done in recent years by the following groups:

Graduate students working for higher degrees in universities have carried through studies of some phases of the problem. They, however, have not had the essential resources to attack many of the more difficult problems. While in no way underestimating the significance of research as a part of the graduate education program, it is time the belief be surrendered that graduate students working for higher degrees can render the essential research in this field.

Faculty members of universities have carried through studies of some phases of the problem. They too, however, have generally not had adequate time or other resources to grapple fundamentally with many of the problems. Some recent developments in this field, however, are encouraging.

Corporations and industrial associations have carried forward research in certain matters. They have aided largely in somewhat technical aspects of schoolhousing, such as lighting and in the development of materials. The large contributions made by these efforts should be recognized though there is the problem of self interest involved at times.

National Council and AIA

Associations such as the National Council on Schoolhouse Construction and the American Institute of Architects have sponsored and carried through various studies. These have frequently been studies of practice or status, or of judgment designed to provide guides for practice. They have tended to pull together much of the knowledge which has been gained through observation and experience in actual schoolhouse planning and construction. They have generally not had the resources to identify areas of needed research and to plan and carry through studies designed to answer needs. The contribution, especially of the National Council on Schoolhouse Construction, though sharply limited by small resources, has been large.

Some city school systems, state departments of education, other state agencies and the Federal government have carried on certain research activities. Federal activities have largely been of the survey type such as the recent school facilities survey. A few state departments of education have been staffed in such manner that they could, through observation and study, arrive at sound positions and programs on some matters and take leadership regarding them. In general, however, they have been extremely limited in resources and have been largely devoted to serving immediate field needs rather than to studying issues and problems in a fundamental manner. The New York Commission on Ventilation is an illustration of a state agency, other than state departments of education, involved in a research effort pertaining to schoolhousing.

Certain other agencies have at times sponsored specific research projects such as those sponsored by the American Council on Education on sanitary facilities and school furniture. Provisions from such sources, however, have been extremely small.

In conclusion it can be stated that the outstanding characteristic of provisions for research in the school plant planning field has been their meagerness.

Conditions Retarding Research

The limited nature of provisions for research work in the school plant planning area suggests the desirability of examining factors which explain this situation. The following are offered as some of the more important factors.

Lack of interest in research in the field. Traditionally, schoolhousing has been provided for on a local basis. This continued in large measure even after states began to participate in financing current expenses. The



The schoolhousing problem requires trained personnel for research, individuals with the know-how of lighting experts, architects, public health experts, educators—in fact, all-round abilities.

demand for funds for teachers' salaries has understandably occupied most of the attention of those who have been concerned with securing adequate funds for education during recent years. In most communities and states no organized group of teachers, administrators or citizens has given attention to the schoolhousing problem in the sense that attention has been given to the problem of meeting current expenses. Perhaps there has been too little realization of the significance of schoolhousing for effective teaching and learning. Furthermore, the general view has probably been that little specialized knowledge is essential to erect a school building.

No Cooperative Plan of Attack

Inadequate cooperation among the parties involved. Architects, engineers, public health specialists, teachers, school administrators and lay citizens have not planned a cooperative attack upon the schoolhousing problem. This has been true in many instances at both the local and state levels. This is largely the result of their different and unclarified responsibilities for the job. Possibly there have also been some vested interests which certain groups may have been consciously or unconsciously protecting.

Lack of belief in the research approach to problems in education in general. The failure to provide for more adequate research in schoolhousing is but a part of a greater failure to provide for significant research in education. Few other services representing an expenditure as large as that for public education have had so little publicly sponsored research effort. Even in those cities and states in which research departments have been established the resources provided have been meager. The work which they have done has been largely the collection of statistics.

A lack of trained personnel to carry on the research. Who is a competent person in regard to the many aspects of the schoolhousing field remains an open question. The individual attacking different aspects of the problem should have the training of the illuminating engineer, the architect, the city planner, the public health expert, the optometrist, the educator. Other fields might also be involved in the education of personnel engaged in research in school plant planning. Obviously no one person will have all this breadth and depth of education. The various competencies, however, must be available if the work is to be carried on effectively. The answer may be found in broader education of selected people who accept leadership responsibilities and in the fuller involvement of more specialists.

The funds which have been provided for work in this area have been quite inadequate. This inadequacy is explained in considerable part by the preceding factors and conditions.

In this section an attempt will be made to present briefly some of the important areas in regard to which considerable research work should be carried forward. A fuller treatment of needed research is found in Chapter XVIII of the American Association of School Administrators 27th Yearbook, 1949.

Needed Research in Plant Planning

First, there are the problems pertaining to clarification of educational aims. What provision, for example, should be made for adult education, public health services and public library services? What methods need to be employed at what grade levels and in what aspects of instruction? What will be the nature of the activity which is carried on in the various classrooms and laboratories? What use is to be made of the site in light of educational aims? Are there aims which point to work and rest rooms for teachers and to conference rooms for parent groups? Can the aims be clarified and utilized as guides to action?

Aims and functions must be translated into form, design and space. Even when aims are clarified what organization of elementary and secondary schools is the best? What types of materials, equipment and facilities are necessary in order to employ specified methods or stated activities in a most effective manner? What activities need to be engaged in to facilitate the growth of individuals toward specified aims? What space should be allocated for activities in light of the educational aims? What designs facilitate what educational values? Should all regular classrooms give way to learning laboratories? This translation of aim or function into form remains an exceedingly difficult task even after aims have been clearly developed.

Maximum flexibility, expansibility and movability must be achieved. However far one goes in clarifying aims and in determining the types of activities which will be carried on and the experiences which should be provided, there is little question that these matters will be considerably modified in the years ahead. What is the proper balance between meeting present aims and favored activity and meeting needs of a changing society? Furthermore, the problem of a mobile population raises the question of whether permanent movable structures can or should be developed.

The process of planning and carrying through the whole program of schoolhousing development must be highly organized. What should be the respective responsibilities of lay citizens, school administrators, teachers, district employed architects, private project architects, engineers? While the desirability of considerable participation is recognized today, little has been done to evaluate the processes of planning which may be engaged in. How can teachers participate most effectively? What provisions are imperative to insure basic educational planning? What contractual arrangements are essential?

There are problems involving land use and com-



An exceedingly large school building program is demanded by the great increase in the number of school children, as well as by the need to replace unsuitable school buildings.

munity planning in relation to the school. To what extent should the school be seen as a phase of the more complete land use and community planning? Should K-3 units be employed because of their relation to the neighborhood as seen by the community planner? Should schools be developed in light of their potential contribution to community redevelopment?

What about administrative units? How can the inadequacy of the existing school district organization be provided for without serious disadvantages to schoolhousing? What steps can be taken in the case of districts which are unjustifiably small? What of overlapping districts? Does the intermediate unit have any responsibilities in this area? What of more general provisions for junior college education? What are the implications for schoolhouse planning in the complex, varied and overlapping local governmental units other than those for educational purposes?

Federal-State-Local Relations

State-local relations and Federal relations have direct bearing on schoolhouse problems. Is the state moving toward uniformity in schoolhousing while professing to seek to stimulate initiative and creativity on the part of local administrative units? With state funds how can undesirable, restrictive controls be avoided? What is the proper role of the state and how can it be exercised more effectively?

Problems regarding materials, construction and equipment must not be under-emphasized. What are the operation and maintenance implications of various materials? What are the relations of various materials to climatic differences? What level of permanency should be achieved under what conditions? What are the results secured through different types of equipment? When is rehabilitation of plant indicated?

There are, too, problems concerning the service system—lighting, heating and ventilating. To what extent shall we depend upon artificial and natural lighting respectively? Upon what forms of artificial and natural lighting? With what glare controls? What are the relations of various lighting arrangements to heating and ventilating?

Last, but by no means least, are the problems of finance. What are the desirable local-state financial responsibilities? How can local abilities be more adequately determined? How can the state best participate to insure efficiency and local initiative and creativity?

How the School Plant Problem Grows

The acute school plant planning problem is the result of many factors and unresolved issues. Only a few of them can be presented here. Among these is the tremendous amount of school plant building which will occur in the next few years regardless of the adequacy of the planning which is done. The increase in the number of school children as well as the need to

replace unsafe and obsolete buildings demand an exceedingly large school building program.

In California, for example, in 1952 approximately 200,000 children were in structurally unsafe buildings. Accommodations for another 100,000 were needed to eliminate overcrowding and half sessions. To these figures must be added the need to provide for a 100,000 to 150,000 additional enrollment each year over the previous year during the next decade. These facts plus related data throughout the country emphasize the demand for much building and indicate the tremendous extent to which we are determining today the educational facilities for many years ahead. A fifteen billion dollar investment in the nation during the next decade in public schoolhousing appears to be a minimum.

Educational Planning Factor

Another important factor is the unpreparedness of many educators for the responsibility of educational planning, and for many others the lack of time and resources with which to lead in planning effectively. Recently an architect came into my office and reported that he had been employed to develop plans for an elementary school building to house 1,200 children. When he raised the question of educational specifications he was informed by the superintendent of schools that they needed housing for 1,200 children and that he would appreciate not being troubled about the details of a school building to house that number.

This, of course, is an extreme situation and not found generally. However, there are many instances in which little attention is given to educational specifications—in fact there appear to be many instances in which the meaning of "educational specifications" is not clearly understood. Even when there is such understanding the superintendent of schools all too frequently has to assume responsibility for such planning as another extra assignment to a schedule already extremely heavy. In addition, the superintendent often can give little attention to instructional (educational program) leadership—the hard core of school plant planning.

Changes in Society

Changes in society, such as in housing and the mobility of population, must be considered in relation to the school plant problem. What are the implications of the apartment or of the small home for education? Does the reduction in space in the home, which alters the types of activities children can engage in, suggest an expansion of space in the school to facilitate experience in a greater variety of activities. Given mobility of population, for what period of years should schoolhousing be constructed under varied situations? Is the movable permanent type building an answer?

Controversy regarding the aims of education and changes in educational provisions are not to be overlooked. Does not the struggle for control of education in our society have many implications for schoolhousing? Will cooperative learning effort be emphasized or a more formal individualistic approach? Has the challenge of the trend toward core programs caused a stalemate or reversal? Is initiative to be emphasized or enjoyment in conforming? Is a 7–8 grade upper elementary school to be preferred to a three-year junior high school? To plan to provide for schoolhousing with so many issues being opened or remaining unsettled is exceedingly difficult. Yet action must be taken and children must be provided for while the struggle and tension in society continues.

There is a growing awareness that education must determine housing if housing is to make its potential contribution to education. The school plant problem is acutely related to man's understanding of its possibilities. It is no problem to the community which just builds another school in accord with the traditional pattern and without regard to or awareness of the great challenge in translating function into form.

Involvement of Planning Groups

Then, too, there is recognition of the desirability of involving various individuals and groups in the planning, and the absence of clear guidelines as to the extent and manner in which such involvement should be effected. The necessity of teacher involvement is being more fully recognized, especially in those situations in which teachers have been engaged in fundamental curriculum studies. But what of parent, citizen and student involvement? What resources are essential if teachers or others are to work through significant problems? Should teachers be released from teaching for a period of time to participate?

The introduction of new materials in construction and in the equipment area has influenced the school planning procedure. Many of these materials may offer promise and yet they are in large measure untried. Some of these materials have vigorous proponents who do not aid in impartial consideration.

There are difficult matters of judgment in light of accepted principles which arise even if and when the facts are in. Should extended glass be accepted because of the educational desirability of natural lighting or is constant use of artificial lighting, with its greater ease of control and increased safety in case of explosion or blast, to be preferred? Many decisions must be made which involve consideration and weighing of a large number of factors and values.

Failure of Society

Society has consistently failed to provide an adequate financial program to meet needs. This has resulted from lack of interest on the part of many in this phase of educational finance; failure to establish adequate state responsibility; dependence upon inequitable



School planning has been influenced by the introduction of new materials in construction and in equipment. The planner must be able to make careful considerations of such items.

and inadequate local property assessments; competition for the tax dollar; and holding to the view that buildings are local matters to be cared for locally.

The acute need, while continuing at the elementary school level, will increase rapidly at the secondary level. School planning for the secondary level tends to be more difficult because of the greater variation in offerings, the smaller degree of agreement regarding the nature of a desirable program, the fact that many more children or youth at this age level have not been provided for and have dropped out, the greater expenditure per student, and the possible greater serving of various adult community needs through the secondary school rather than through the elementary.

Proposed Plan of Institutes

The following proposal is offered as one through which the various interested groups might coordinate their efforts with the public interest, one through which significant steps could be taken through research to meet some of the major schoolhousing problems, and one which could be kept clear of any charge of representing a vested interest. It is recommended:

That the research program be developed in and by universities through the creation of research institutes in schoolhousing. This is desirable since research is one of the major roles of the university. None of the other available avenues have comparable experience or the commitment to research. The university has a measure of independence. It does not represent either the state or local administrative agencies or any of the specially interested groups such as superintendents of schools, architects or engineers. On the other hand it is possible for the university to coordinate the efforts and energies of these groups as no other institution or agency could. Furthermore, the university has within it many resources in terms of personnel which could be brought to bear upon some of the wide variety of problems in the schoolhousing area.

That there be established in such a research institute a policy determining and appraising body. This body should work with the university administrative agency both in policy determination and in appraising results achieved. It would advise regarding the significance of various possible areas for research. This group should represent various departments of the university such as optometry, architecture, public health, economics, social welfare, public administration and engineering, as well as education. On it should also be found representatives from the field including such agencies and groups as the following: state department of education, state department of public buildings, architects, contractors, school trustees, superintendents of schools, city managers and public health administrators.

That the administrative agency in the university established to carry on the work be provided with an

adequate staff. Staff members should be selected to devote most of their efforts to research work. In some instances it probably would be desirable to have them teach on a limited basis. Staff members should be selected to represent various competencies which are related to the schoolhousing area. They should have educational backgrounds in architecture, lighting engineering, city planning and other areas. The direction of the agency should be in the hands of someone broadly prepared in education with a special interest in schoolhousing. He should be skilled in working with advisory groups and in planning and coordinating the work of the staff of the institute.

That the primary purpose of the agency be clearly established as being research. This is not to deny the significance of the service or teaching functions of the university. On the other hand it is believed that the service function in school plant planning can be most effectively discharged by state departments of education. The university research agency should be one of the agencies to which the state department would refer problems and to which it would turn for assistance in planning its service program. Similarly it is believed that while the research institute in schoolhousing would serve an important teaching purpose in many divisions of the university, this should not be the primary responsibility of the research institute. At the same time the various provisions of the university, such as city planning, lighting engineering, social welfare and education, might well use the research institute as an avenue through which some of their graduate students could enjoy unusual opportunities.

That the research institute be financed by the state. In view of the fact that education is a state function and that the state will have to participate in schoolhousing in a more direct fashion, it is believed that the need of financing the research function should be met directly. The funds spent for research should certainly result in savings in actual dollars spent for many schoolhousing projects. The savings would, it is believed, be far greater than the total funds invested in the research program. A state investment of $75,000 to $100,000 per year would be sufficient to produce highly significant results. Beyond the savings effected, the educational advantages could be enormous—though difficult to estimate in dollars. The research institute, having a sound financial basis provided by the state, would then be in a position to accept supplementary moneys from local school systems, organizations or industries to carry through research of limited applicability or pertaining to specific elements of the total schoolhousing program.

That various universities take responsibility for selected aspects of the work. This could be determined after a few institutions had gotten programs underway. Each institution might work in certain common areas in its research activity and each should probably have primary responsibility for research along specific lines.

Institute Program Is Imperative

The program herein described is believed to be not only reasonable but almost imperative if our society is to discharge its schoolhousing obligations in a defensible manner in the next decade. If five or six of our universities had such programs, we could feel that substantial economies would be effected in terms of educational returns per dollar invested. Perhaps we should even learn through the exercise of intelligence how to shape our buildings so that they would facilitate education in light of the aims of society. Or shall we continue to shape our buildings in ignorance and permit them to shape us in ways we do not know or desire?

RESEARCH REPORT 1

by
WILLIAM W. CAUDILL
CLEON C. BELLOMY

THE DEVELOPMENT OF THE TEACHING SPACE DIVIDER

THE Teaching Space Divider had its beginning in the teacher's cry for more tackboard and shelving space, and in the administrator's plea for movable partitions. But the real inspiration and stimulation for the development of these units came from a talk on classroom design given by Dr. Charles Bursch of California at a meeting of the National Council on Schoolhouse Construction. Members of our firm had frequently met and informally discussed such topics as the folly of putting up expensive plaster wall surfaces and then partially covering them with chalkboards and tackboards, and the unimaginative waste in building heavy masonry partitions in schools when such partitions must often be moved because of enrollment or curricular changes. But Dr. Bursch's insistence that partitions in classroom wings do more than just divide the wing into cubicles, that they offer vertical work space to help the teaching program, gave the firm's thinking a direction.

At this point it quickly became evident that a wall is more than a wall—it is a teaching device. It is a vertical work surface just as a table is a horizontal work surface. Thus it became apparent that the function of the partition was threefold:

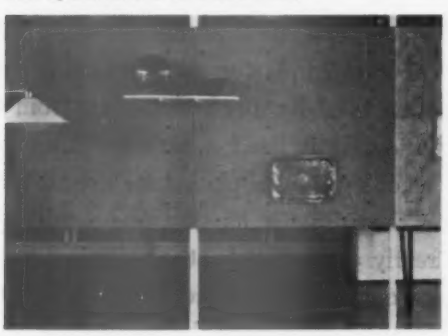
1. To serve as units to divide space.
2. To serve as vertical work surfaces.
3. To facilitate easy interior changes.

The Teaching Space Dividers, as described on the following pages, were developed in an attempt to find versatile, functional wall units which serve the above three functions.

THE PROBLEM:

Must the walls that subdivide a school into classrooms be the traditionally heavy, sometimes load bearing, partitions? Does it make sense to put up expensive wall surfaces such as plaster, then partially cover them with chalkboards and tackboards? Why can't classroom walls be put to work for classroom use?

Here is the experimental model of the Teaching Space Dividers, designed and constructed by the firm prior to the development of the final plans and specifications of these units.



CAUDILL, ROWLETT, SCOTT AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.





1 CHALKBOARD PANELS

The chalkboard panel, as shown above, one of the four types of units of the Teaching Space Dividers, extends from floor to near ceiling height. Thus it is ample for all predictable purposes and can be used by any size person from any desired position. It is itself a wall covering and not just a teaching device placed on a wall covering. The chalkboard with its plywood backing is applied directly on the studs, thus eliminating the mouldings, chalk rails and the usual finished wall behind the chalkboard. Both the tall teacher and the small pupil can use the board comfortably. The teacher, too, can use the chalkboard while seated in a small demonstration teaching group. The unit, like the other three, is four feet wide and is prefabricated and demountable. This panel is an adaptation of a design by architect Alonzo Harriman.

2 DOWEL PANELS

Here is a photograph of the dowel panel, a Teaching Space Divider unit. In some ways it is like a tinker-toy, a device with which the teacher can build her own shelves for a reference library, construct her own brackets for three dimensional visual aids, and make her own easels. The panel consists of a plywood surface mounted on wood studs. Each panel has insert holes for hard wood dowels. The insert holes have solid backing so that the dowels can hold up heavy objects, a row of reference books, for instance. The panels are equipped with shelving boards, paint trays and drawing boards. The dowel panel is designed so that teachers and pupils can devise their own individual teaching setups. There is no limit to the number of setups when imaginative teachers and students are involved.



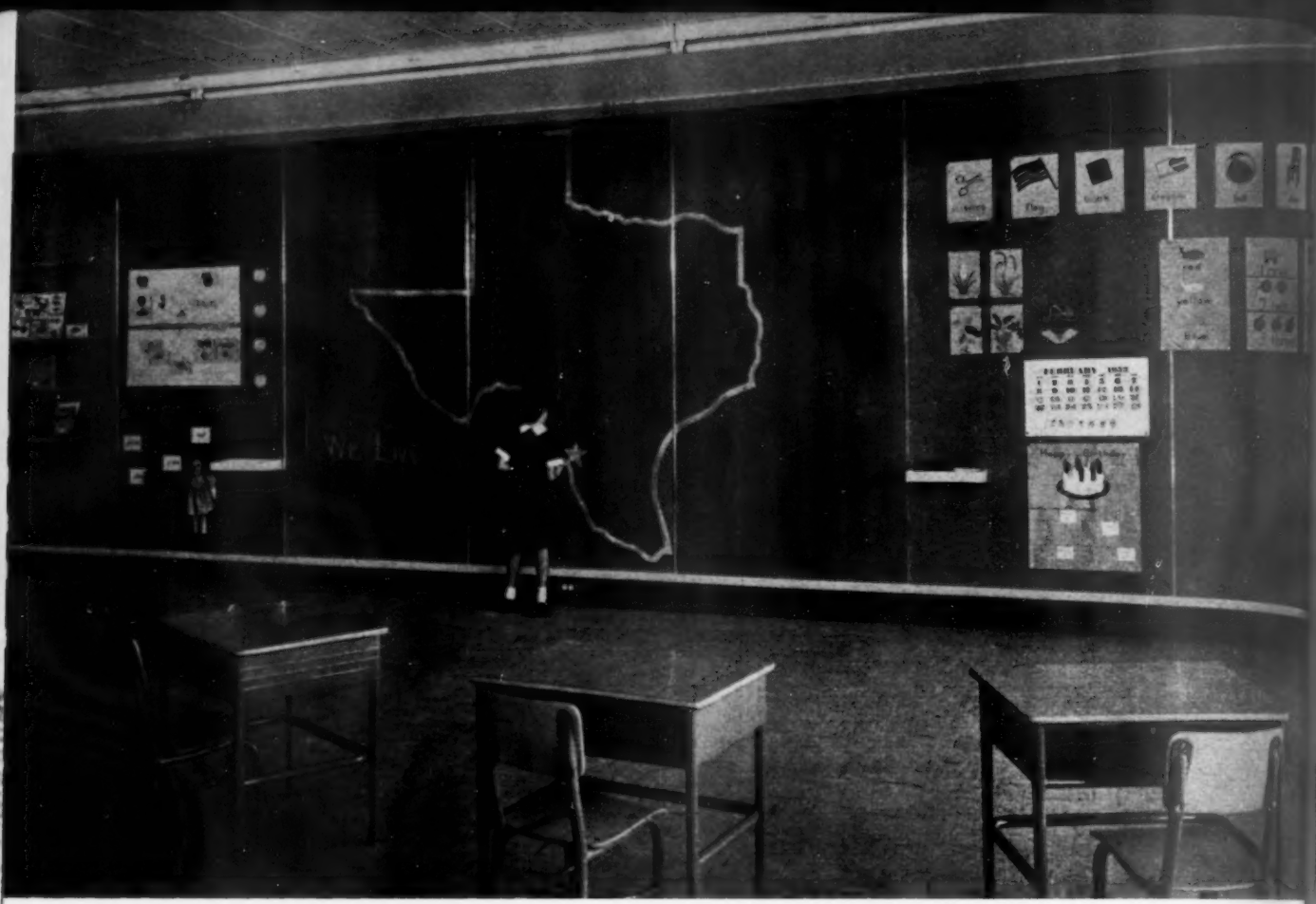


3 TACKBOARD PANELS

Tackboards, mere token scraps in the conventional classroom, are full height panels in the Teaching Space Dividers. They are applied, as are the chalkboards, directly to partition studs. As is shown the tackboard surface is from floor to near ceiling height. Here every square foot of the wall can be used for educational purposes. Here, too, is the answer to the teacher's cry for more tackboard space. This expansive use of tackboard makes the classroom wall a true vertical work surface. Like the other two panels, this one has a four-foot module and is built as a separate unit which can be easily demounted from the wall. It offers many possibilities for displays and visual aid arrangements.

4 PERFORATED PANELS

The fourth basic panel of the Teaching Space Dividers is the perforated panel. This panel, consisting of perforated asbestos-cement board or hard pressed fiberboard, makes an excellent surface on which to secure posters or pictures. There are commercial fittings which can be used on these units for hanging various objects, but ordinary golf tees serve quite satisfactorily. Above is shown the use of small colored pegs which hold up the visual aid material. Acoustical insulation serves as backing for the perforated panel. This fourth basic panel also has a width of four feet, is prefabricated and demountable, and can be interchanged with the other three panels. The perforations add a pleasing texture to the wall.



A Definition of the Teaching Space Dividers

The Teaching Space Dividers, therefore, when arranged together to formulate an interior wall, provide a vertical, all-purpose work and storage surface designed to separate classrooms (as well as any and all other kinds of interior spaces) from one another. The Divider is not a wall though it does the job of the traditional wall it is designed to replace. The Teaching Space Divider bears close relationship to a piece of furniture or equipment which is to be moved in after the building is completed. It is not a system of built-in shelving though it incorporates some of the advantages. It is a vertical plane surface to be used fully, naturally and unconsciously, just as table tops and floors are used as horizontal surfaces on which to conduct educational activities.

Are They Expensive?

But are the Dividers expensive? At this point of their development they have proven quite inexpensive. They were first used in the Laredo, Texas, schools (three new elementary schools and one new junior high school). In order to have a clear-cut cost separation the letting was arranged in such a way that the basic bids did not include the Teaching Space Dividers. In other words, the basic bids concerned the construction of a loft type building without the partitions which separated the classrooms. Bids were based on three schools involving 44 classrooms. Without the Dividers the total construction cost was $582,000. With them it was only $24,000 more—*only 4 percent of the total construction cost for the cost of the Teaching Space Dividers.* This amazing low percentage figure may not hold true for future lettings, but it certainly gives an indication that the Teaching Space Dividers are economical.

What the Future Holds

The Teaching Space Divider is still in the developmental stage, and ideally it always will be. In its present stage of development, its economy and educational versatility recommend it as a distinct advantage over the wasteful, inflexible and inadequate vertical surfaces of yesterday. It is potentially capable of even better performance. For example, it is theoretically possible to install all of these various kinds of panels so that a teacher or janitor could remove and interchange them quickly and easily using only a screwdriver. In this event, the Divider's adaptability would be virtually limitless. Again, if the Teaching Space Divider comes to enjoy a wide application, manufacturers of school furniture and equipment might see fit to design items especially for use in classrooms having this kind of vertical working surface. Whatever lies ahead for the Teaching Space Divider, the firm is pleased to be able to offer it in the interests of further and better use of teaching space.

SPATIAL APPROACH TO PLANNING THE PHYSICAL ENVIRONMENT

THE customary approach to architectural design is to start with a box. That is, most of us when we design buildings start with a preconceived architectural form, usually a boxlike shape, and then attempt to adapt this shape by punching holes in it to let in light and air and to control the view. This approach has the sanction of tradition inherited through centuries in which it was technologically necessary; but during this century technological advances have allowed the light, ventilating and viewing holes to become larger and larger until they have figuratively eaten up the walls which surround them. We no longer need the box as a starting point, and, since we do not need it, it is time we quit saying, "Let us start with a confined, dark, unventilated space and punch some holes in it so it will be less confined, dark and unventilated."

Time for a New Approach

It is time to take advantage of our technological progress and find a more optimistically positive approach and say, "Let us start with all nature, keep everything desirable—spaciousness, view, natural light, comforting breezes—and eliminate only the undesirable." This new approach would not be confined to the building lines of a cube or of any other preconceived shape; it would be a spatial approach, not a box approach. It would make us face the fact that space is fluid, without end and without an inside or outside. This spatial approach, if clearly understood by designers and laymen alike, can be the approach to a freer, more natural and more beautiful architecture.

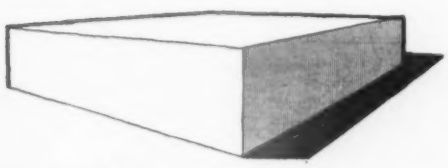
The next three pages are an attempt to explain in simple graphic terms what is meant by the spatial approach to planning the physical environment.

RESEARCH REPORT 2

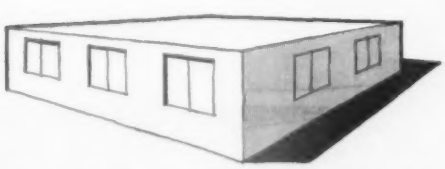
by
WILLIAM W. CAUDILL
CLEON C. BELLOMY

THE PROBLEM:

Architects impose upon themselves and their art unnecessary and unnatural restrictions when they consciously or subconsciously start with a box,

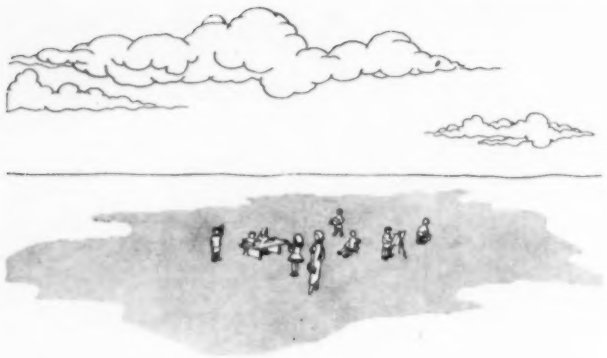


then punch holes in the box to admit desirable light, air and view.

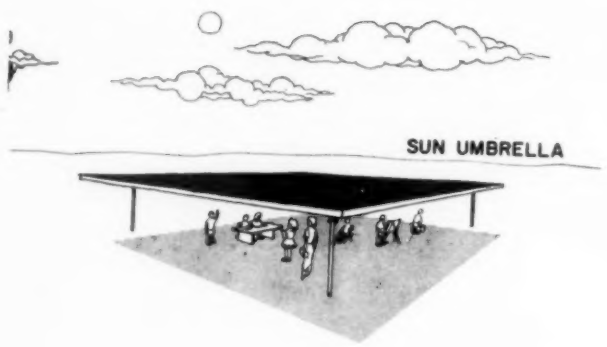


This point of view has particularly hurt educational architecture. The purpose of this report is to suggest a fresh and more natural approach to a fresh and less restricted architecture.

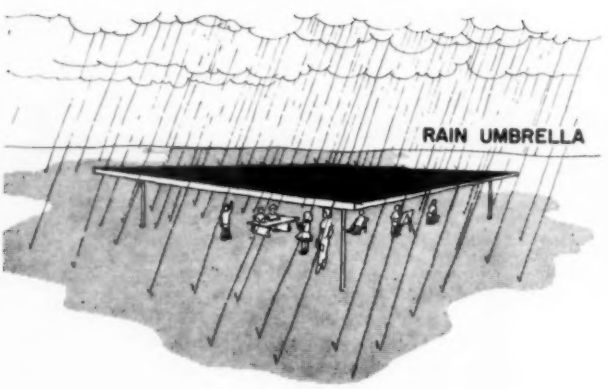
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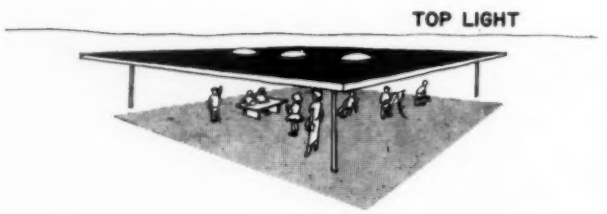
If the temperature, the breeze and the view are just right, if the sun is behind a cloud, and if the necessary teaching equipment is available, a class could very well be conducted in the middle of a pasture. And the pupils would love it!



But if the sun should come out, an uncomfortable glare condition would exist; some sort of umbrella would be needed. When one is added, the undesirable is eliminated and everything is back to maximum desirability.



The umbrella, however, cannot be just a sun shield. Suppose that all other conditions remained right, but that it started raining. The umbrella then would have to be rainproof, and it would have to be large enough to insure protection for all the children. When these alterations are made, the physical environment tends to return toward a state of maximum desirability.



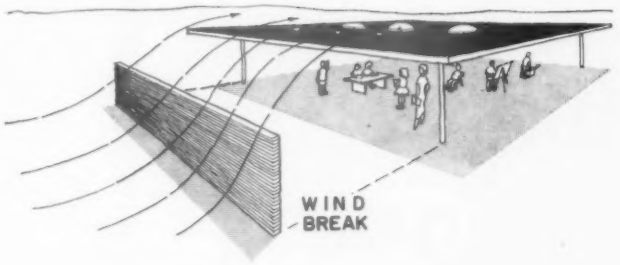
Enlarging the umbrella does not necessarily insure a return to the best physical environment because in all probability it reduces the light intensity to below the desired minimum. To correct this condition it becomes necessary to have the horizontal screen or umbrella made partially of transparent or translucent material to bring the light intensity back to its maximum desirability.

The *horizontal screen,* or umbrella, is a basic concept in the spatial approach; it is, in fact, one of the two most important architectural elements used by planners following the spatial approach.

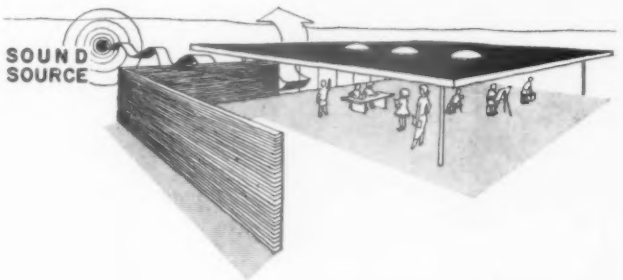
This screen serves primarily to keep the sun and rain off, but it also may be required to help let in light, to keep out sun heat or to retain room heat.

It might even be required to help frame desirable views for, though the shape shown here is a simple horizontal plane, the umbrella can be made to take virtually any shape and position.

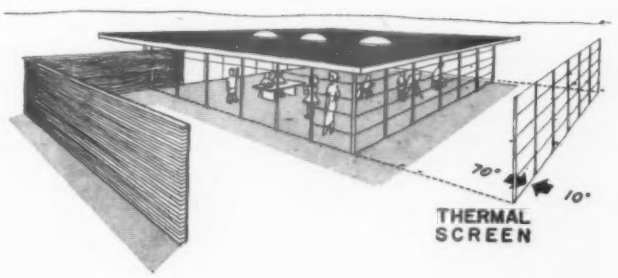
Suppose that with the help of a fully developed umbrella all physical conditions are again just right, but that the breeze increases to an undesirable speed. What is needed in this case is a vertical screen, or wind break, that would direct the wind over or around the children. This screen is not necessarily a wall located, as under the old limited concept, at the building line; it could be located there, but it could just as conceivably be placed either outside or inside the building line.



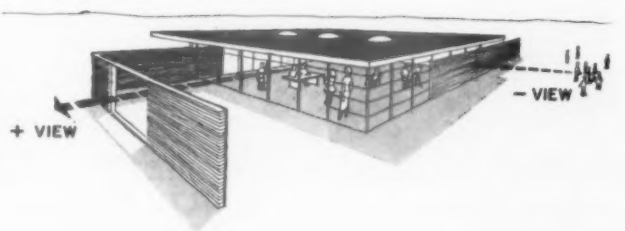
Assume next that after the addition of a wind break to bring the environment back to a state of maximum desirability, a disturbing sound source, say the noise of passing traffic, obtrudes itself. Once more a vertical screen is called upon to correct an undesirable condition, and this screen too can be placed with a new freedom—near the sound source, near the children or any place between.



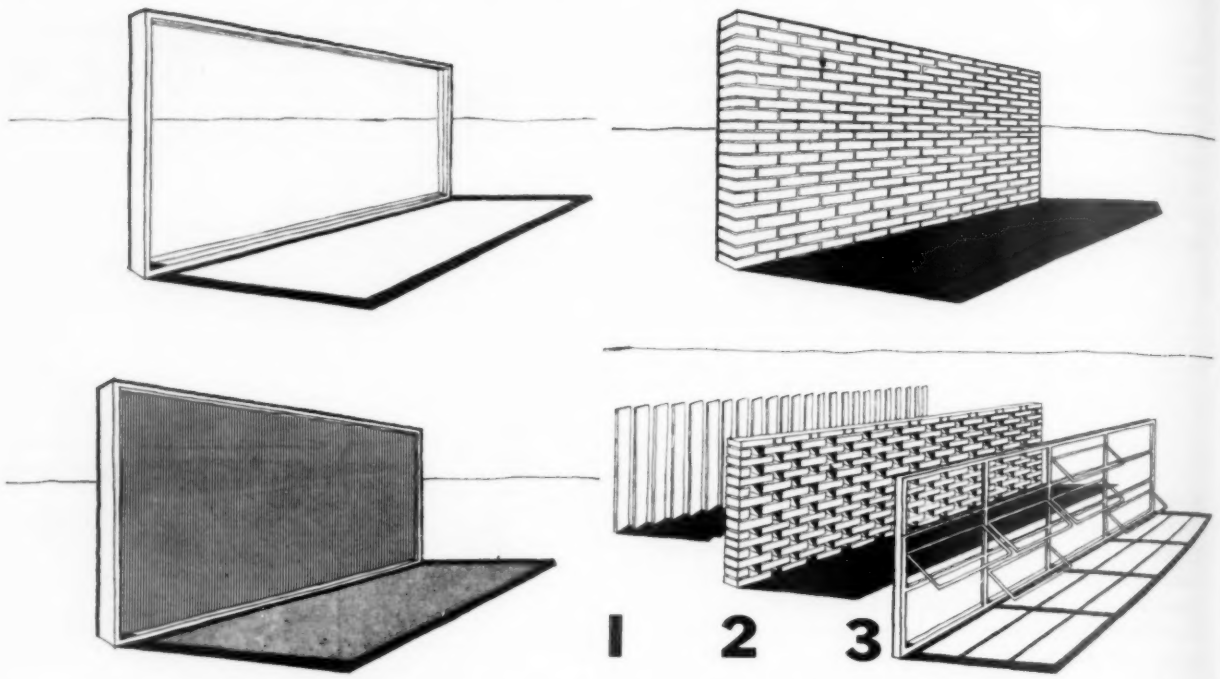
But suppose it gets cold, far colder than the 70 degrees or so wanted for comfort. This condition calls for a thermal screen. The vertical thermal screen must, of course, be at the building line and when it is connected with the umbrella, that screen too becomes a thermal screen and must be designed accordingly. What is achieved at this stage is not the old box for a number of reasons, only one of which is that if the light and view were just right, the vertical thermal screen naturally, almost inevitably, would be transparent.



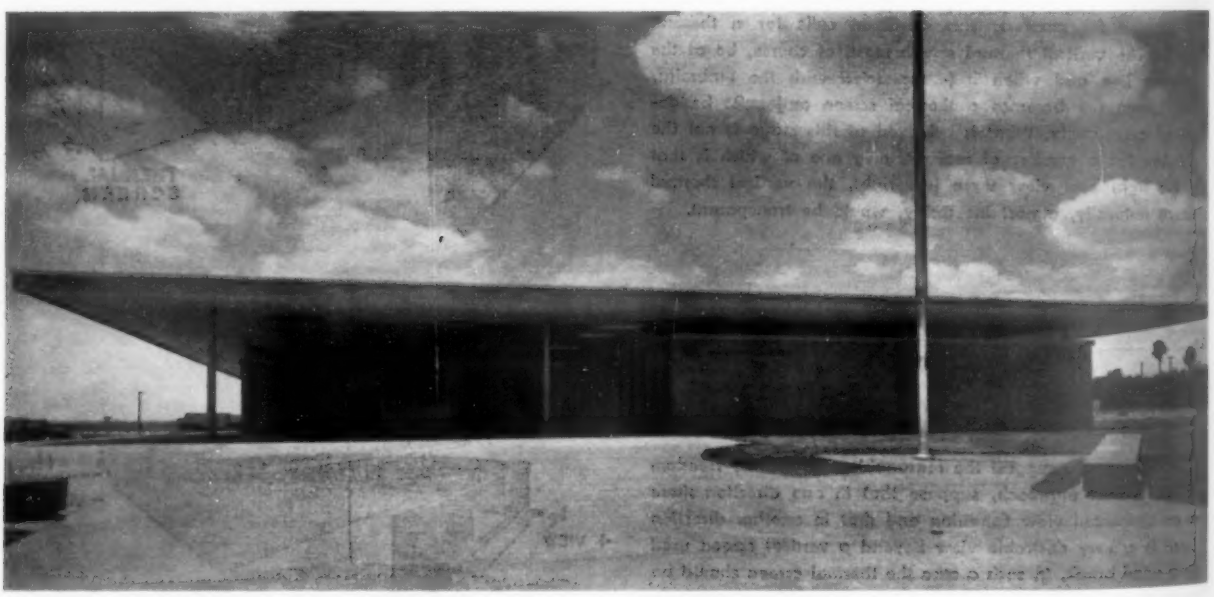
Now, in order to suggest the reasonableness and the freedom of the spatial approach, suppose that in one direction there is an unwanted view condition and that in another direction there is a very desirable view beyond a vertical screen used as a wind break. In such a case the thermal screen should be partially opaque on the one side and the wind break partially transparent on the other.



The *vertical screen* is the second basic architectural element in the concept and vocabulary of the designer following the spatial approach. This vertical screen is not necessarily a building wall, though it may often be so. The traditional wall on the other hand, though it is inevitably a screen, is usually more complicated and much less functional than the screen conceived by spatial design.



Here are the basic screen types (horizontal as well as vertical) with which the architectural composer works: top left, the transparent screen which can serve as a wind break, a sound barrier and a thermal screen, and at the same time permit a view; bottom left, the translucent screen which, in doing these same things, permits light but eliminates a view; top right, the solid or opaque screen which fulfills all these functions except that it eliminates both light and view; bottom right, the pierced screen which can have the qualities of opaqueness, translucency and transparency with the added quality of allowing air flow.



The spatial approach will lead us, as it has in this new elementary school in Laredo, Texas, to a new kind of architecture as fresh and unrestricted as the approach itself and as technologically progressive and independent as the civilization which is producing it. The spatial approach will give the architect and the builder the needed freedom to balance the construction budget. The spatial approach will also give the educator a real chance to offer his pupils comfortable, highly functional spaces for learning.

RESEARCH REPORT 3

TOWARDS AN ECONOMICAL FLEXIBILITY

by
L. S. RICHARDSON*
WILLIAM W. CAUDILL

WE write of FLEXIBILITY—a much talked of subject about which little is done. One of us is a superintendent, the other an architect. It is fitting that we write this report together because, if something is to be done about flexibility, the architect and the superintendent must get together to do it. That is our first point of emphasis.

Flexibility is an old word, but it represents a new quality of architecture. The inflexible characteristic of old school buildings is familiar to all of us. When our teaching program requires larger interior space, we cannot have it because the interior walls which hold up roofs or floors cannot be moved. When increased enrollment demands additions to our old buildings, either we have no ground space on which to put additions or the type of architecture simply will not permit them.

Yes, changing curriculum and increased enrollments are demanding a flexible type of architecture. We find ourselves in a dilemma. We like traditional architecture forms, but they will not give us the flexibility that we so desire. Therefore, we must open our eyes and shut out our prejudices so that we can

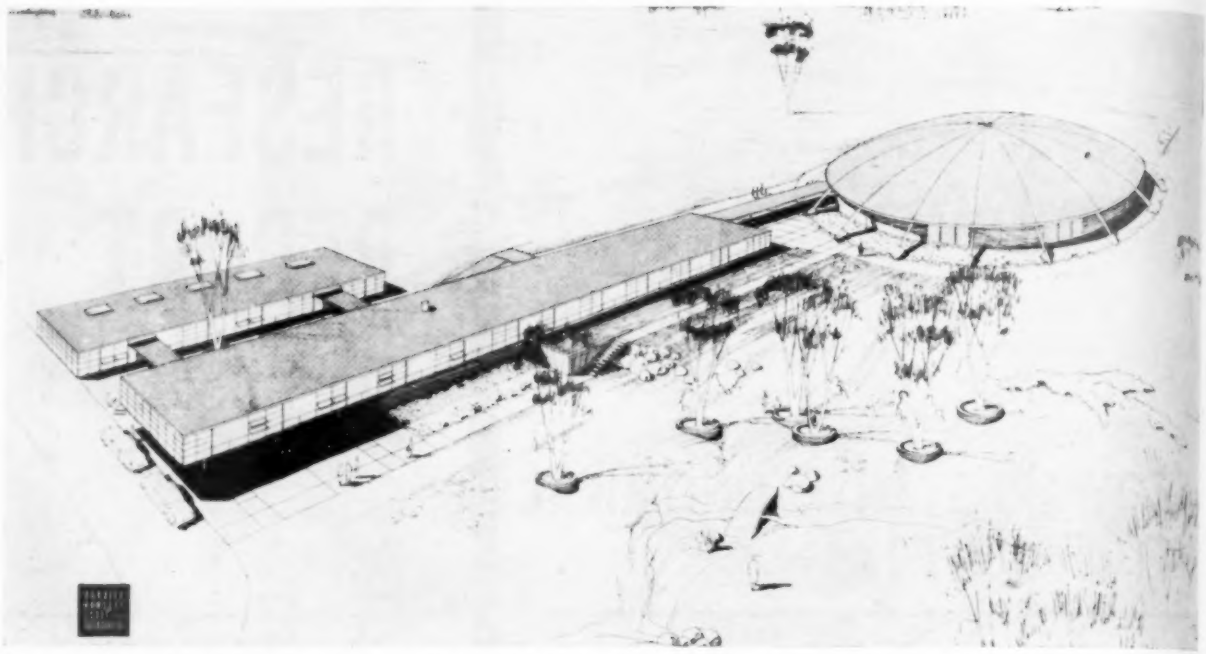
*Lester Scott Richardson, Jr., Superintendent of the A&M Consolidated Schools, College Station, Texas, has served in that capacity since 1949. Prior to then, he was a high school principal in the same school system for three years. He served with the U.S. Navy Seabees during World War II. Mr. Richardson received his Bachelor of Science and his Master of Education degrees from Texas A&M College. He has done further graduate work at Teachers College, Columbia University, and at the University of Houston, where he is currently engaged in completing his dissertation for the doctor of education degree.

THE PROBLEM:

Educators and architects, with unsureness of the future, face the problem of providing more space for secondary schools. A decade of elementary school construction leaves us with few techniques that will help solve the high school space problem. Enrollment and class size predictions are difficult to make because of elective type programs, drop-outs and mobility of population. We are changing our high school curriculum to meet new philosophies and to satisfy demands by the citizenry. We will continue to change it in years to come. We exhausted our finance potential in grasshopper fashion when we erected our elementary schools. Now, with limited building funds and fresh demands for an improved high school curriculum, we must provide space for the children who engulfed our elementary schools ten years ago. The answer appears to be in an economical flexibility.

This report shows how one school district obtained an economical flexibility in the design of its new high school by (1) arranging space for an increasing enrollment, and (2) by providing space to house any type of curriculum. And on a limited budget!

CAUDILL, ROWLETT, SCOTT
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This sketch of A&M Consolidated Senior High School, College Station, Texas, designed by Caudill, Rowlett, Scott and Associates, shows the three main elements of space. The circular building on the right is the assembly-music center. The long rectangular front wing contains classrooms and the activity room which serves as the "living room" for the school. The back wing contains the laboratories. A sloping terrain makes possible an essential outdoor terrace on the level of the administration unit (left).

search for a new kind of architecture that will give us the flexibility we want. That is our second point.

We have one more to make before discussing the approach which we took in trying to find an economical flexibility. Please note, we say "approach." You, the reader, will find in this report certain solutions to our problems of changing space. However, you should remember that although these solutions are very important to us, they are not necessarily important to you. What is important is the way that we went about trying to solve our problems. Yes, the approach is the common denominator to both your problems and ours. Therefore, it is the approach that counts, not the solution. That is our third point.

Community Growth Creates Need

Our job was this. As leaders of the team of architects and teachers, we had the task of directing a coordinated effort to find answers to some difficult space problems. What are some of these problems? First, let us give you an overall picture of our situation. Ours is a college community, the home of the Agricultural and Mechanical College of Texas. Almost all of our residents, in one way or another, are dependent upon the college for their bread. Our town grew up around three sides of the college. Not until 1938 did it really expand enough to be incorporated.

The main source of income is the college. There are a few general stores for groceries and clothing. There is no industry. About 85 percent of the school taxes come from taxes on residences. Taxes for both school and city purposes are low when compared to those of neighboring towns. For that reason, and the fact that we have all of the facilities of a metropolis, people like to live here. The town is small enough, with a population of 7,000, so that there is no traffic problem.

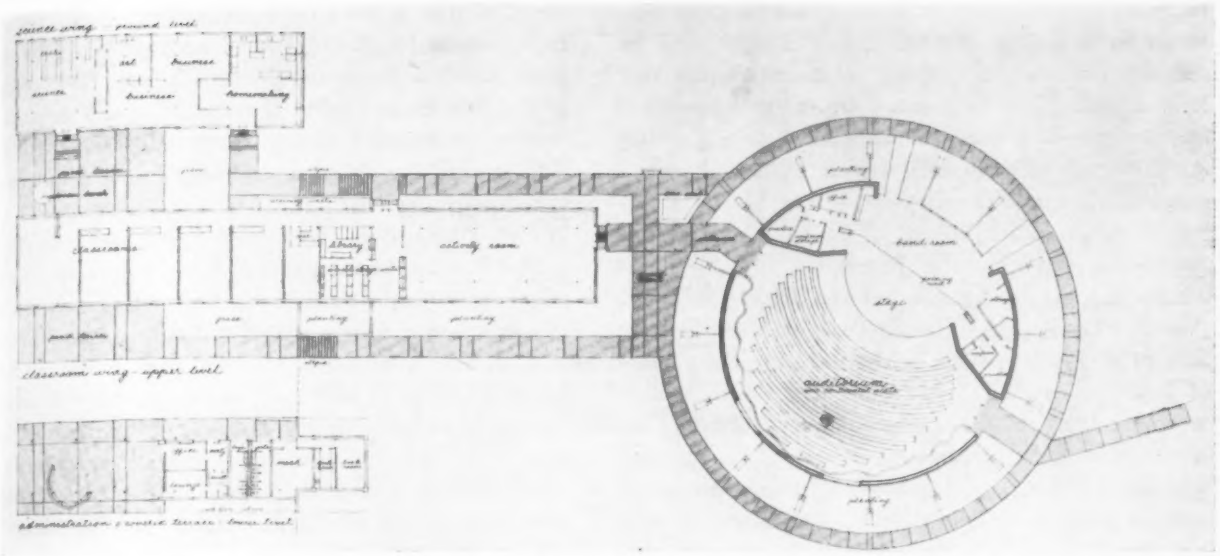
In 1950 we made a cooperative study of enrollment trends. At that time, we anticipated the high school enrollment for a period of ten years.* Four years later we found that we had missed our prediction by only four students. The enrollment growth of our school district bears a remarkable similarity to that of the nation as a whole. The gain in scholastic population is attributed to three factors: (1) an increase in the size of the college facilities; (2) an increase in the non-college residents (College Station is a bedroom-community to Bryan); and (3) an increased birth rate.

These factors have created a real housing problem in our elementary grades, particularly during the last four years. The surge is now beginning to reach our secondary school. We have every indication that the rate of enrollment flow into our secondary school will increase; therefore, our problem and probably yours too, is difficult. How can we plan our secondary school plant to take care of this surge? We believe the answer is flexibility.

Changing Curriculum Requires Flexibility

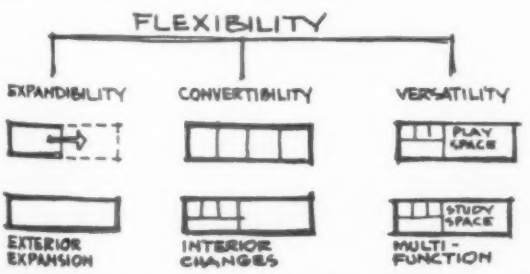
When the two of us sat down with our respective staffs to analyze the educational space needs, about

* *"Your Schools"* by W. W. Caudill, Texas Engineering Experiment Station, College Station, Texas, 1950, p. 18.



This is the floor plan of the A&M Consolidated Senior High School which is now under construction. The assembly-music center on the right is designed to seat 600 people during programs with as many as 250 performers, but can be expanded, by using the band room, to seat nearly 900 during special occasions such as commencement. The school building is on three levels. The top level contains the classroom wing and the assembly-music unit. The second level, or stair landing, contains the laboratory wing. And the lower or street level contains the administration unit.

the only thing that we could agree upon concerning the future program of our school district was that none of us knew what it would be. We could have licked this secondary building education problem if we had been satisfied to come out with a formula which said, "For every so many students, we must have one science laboratory, one homemaking laboratory, five academic classrooms, etc.," and that, "A library shall have so many square feet for every pupil enrolled, a cafeteria shall have so many square feet for every pupil, etc." No such formulas are for us, and we have a hunch that these rigid standards are not for you, either, even if you did know your exact future enrollment. The curriculum is not static in College Station. We doubt if it is static any place. It changes from day to day, child to child, and community to community.



We decided it would be foolish to plan the high school around our present curriculum, labeling doors with subject matter headings—English, social studies, mathematics, art, library, science, etc. We did that with our present high school, which is only four years old, and which now will be converted into a junior high school. A room we had planned as a library is now an art room, a planned science room is now a social studies room, a study hall-library is now subdivided into classroom space. Yes, during this four year period many internal changes have taken place in the building because of curricula changes. Our new high school must be designed to take care of this changing program for the next ten to twenty years. That was our problem, and perhaps it is yours. Apparently the solution was flexibility, whatever that may be.

What Is Flexibility?

Flexibility means different things to different people. To some, it means that quality that allows for expansion. To others, it means the quality of being movable. To others, it means changeable; and to still others, flexibility is just a word that is associated with an up-to-date school building. During our programming process, we decided that we had to pin down the word since it meant so many things to so many people. We agreed that it therefore must have some general meaning.

For our purposes of planning we broke flexibility down into three separate words—expandability, convertibility, versatility. We agreed that expandability is the word which defines the quality of efficient exterior expansion. Convertibility is defined as the quality of efficient interior changes, and versatility is defined as the quality which allows multi-function. Because of the increasing enrollment and changing curriculum, we decided that our new high school architecture must have the *quality of expandability* to take care of this surge of children and such new courses that require additional space. We decided that our new high school architecture must have the *quality of convertibility* to

take care of certain interior changes that are made necessary by this surge and curriculum changes. And we decided, too, that because our community had a very limited pocketbook for taking care of the educational program, our new school building must have a certain *quality of versatility* to allow for high utility of space—space that has many functions.

We have a real problem of limited finance. While our district has grown in population, a gain in tax wealth has not been increased accordingly, although there has been some increase. Texas statutes limit the amount of building fund indebtedness by the amount of local tax wealth. This factor, along with the increased cost of education, places a pretty definite limitation on building construction for our College Station schools. Therefore, our job as school planners was not only to provide adequate facilities at minimum cost, but also to provide such facilities which would take care of a continual enrollment growth and a changing curriculum. That meant to us that we had to seek an economical flexibility.

Planning for an Expandable Plant

First, we made a case analysis of our existing facilities. The entire community was brought in on this survey, and many suggestions were offered. Since crowded elementary classrooms were still a problem, some of the people wished to build more elementary classrooms instead of high school rooms. Some wanted to build these new elementary classrooms on the same site. Others wished to start new elementary schools elsewhere.

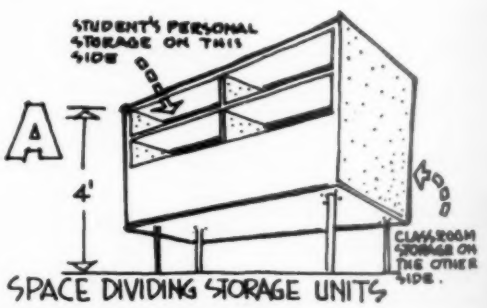
The more forward thinking people in the community anticipated this surge of children into the high school and decided that it would be more economical in the long run if the present school plant, which houses grades 1 through 12, was expanded with emphasis given to the building facilities of the upper grades. This latter group won out after a much heated community debate, and it was decided to buy twenty additional acres adjoining the present site. It was also decided to convert the relatively new high school into a junior high school building, and to reorganize the school system from a 5-4-3 plan to a 4-4-4 plan. With this additional twenty acres, we started developing a master plan which would allow our community school to grow effectively and economically.

It might be pointed out here that there had been little success in the past four building programs in obtaining a unified school plant, and at least three extreme types of architecture were evident. Our plans call for pulling these three types of architecture together into a beautiful unified scheme. It will take some years to accomplish this, but the unified plan allows this to be done in an orderly manner. The most important thing about the master plan, as the sketches show, is that it does have the quality of expansion. It has space for the individual units of the plant to grow. And it is inexpensive! Yes, it is true that in order to get this expandability the cost of additional land had to be included in our construction budget. But land is relatively cheap when you think of it in terms of a good investment.

In 1939, when our school board members purchased fourteen acres of land to house our entire school plant, many people thought that they were crazy. Whoever heard of putting a school on fourteen acres? Now, only fourteen years later, we have had to buy twenty additional acres to take care of our educational housing needs and that is not enough. The writers advocated obtaining 80 additional acres with provision for combined city and school playgrounds until it would become necessary to use it exclusively for the school system. We believe that twenty years from now the community will wish they had purchased it. To obtain the quality of expandability, land is necessary, but in our section land is relatively cheap. Despite the fact that some of the planners felt that our master plan really calls for more land, we have obtained the quality of expandability and we have purchased it at a low figure.

Planning for Convertibility

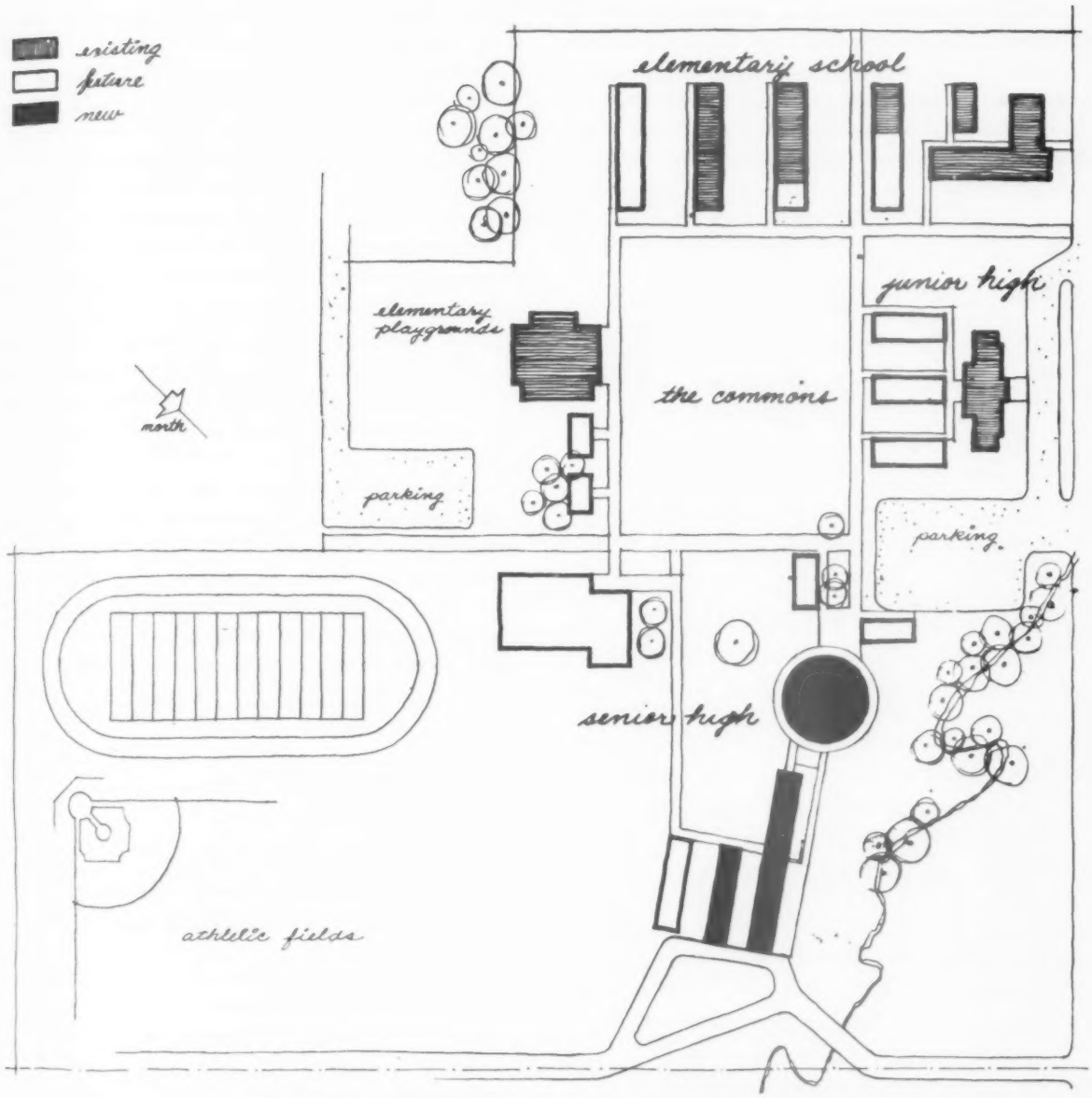
Much has already been said about the changing curriculum. All of us on the planning team were fully aware that since teaching methods vary, so do space requirements. Teaching methods will vary from teacher to teacher, from one group of students to another, and from one year to the next. Materials and equipment for teaching will also vary. Only four years ago the school district had followed the curriculum approach to design of a high school, and had designed a building



SPACE DIVIDING STORAGE UNITS

based on a rigid pattern of rooms for an existing curriculum and a current corps of teachers and administrators. It was found that such tailor-made facilities do not fit the next program.

During the early conferences of our planning team someone said, "Why don't we build a building so flexible that we can design and construct the arrangement in August for the program which we know will be with us in September." To most of the planning team,



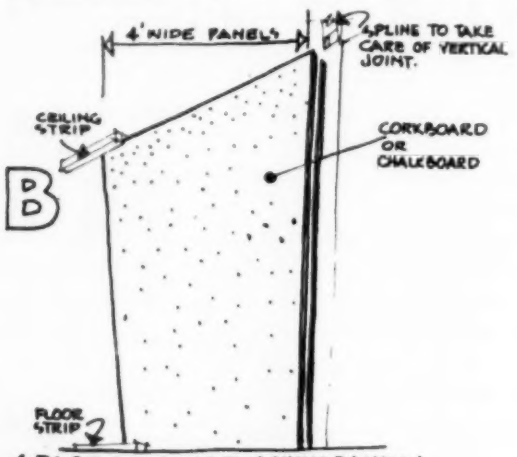
Here is the plot development plan for the entire school plant at College Station, Texas. The new A&M Consolidated High School is shown in black. The gray building blocks are existing buildings. The outline blocks are future buildings and additions. The current building program included the purchase of 20 additional acres, the rectangular area on which the high school is located, which brings the total area for the entire plant, as shown here, to 34 acres. The creek and trees north of the new high school will provide many opportunities for outdoor learning situations.

this sounded facetious. However, one of the planners who did not know any better said, "Why not?" That settled us down. Why not? Office building arrangements are never designed for a fixed operation. Companies move in and out all the time. Why not design our school like an office building? So we did.

Our classroom wing, as the sketches show, actually is one big loft. This loft can be subdivided economically and efficiently with what we call space dividers. In our case, we have two types of space dividers. One type, identified as Unit A, is a movable storage cabinet unit which provides pupil book storage, classroom shelves and material storage. Unit B is a space dividing teaching panel, 4 feet by 8 feet. Wall panels can be grouped together to form teaching walls. These panels have chalkboard surfaces or tackboard.

Economy was achieved by using these teaching surfaces as the walls themselves. Most schools have these materials pasted over regular wall materials and, consequently, the construction cost is padded. Our bids gave evidence that these two types of space dividers are economical. Our classroom and laboratory wings are therefore like office buildings. Each wing will have movable space dividers to meet the many space changes that enrollment and the curriculum demand. That is what we call convertibility. Our cost figures show that we have obtained this quality of convertibility without added expenses.

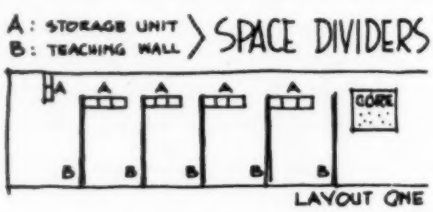
Since ours is not a wealthy community, our school plant must be designed to allow for maximum utility. We knew from the start that, if possible, every square foot of space should be used for the school program. We wanted our school plant to be more than a place for dispensing knowledge or a storehouse for our children during the day. We wanted our new school to aid in the growth and the development of the individual; and we wanted it to be a real instrument of community living. That meant to us that the school had to be much more than a shell subdivided into cells called classrooms. It needed to facilitate indoor and outdoor meeting places of small and large groups. It needed to provide a social environment and space where children and adults alike can gather to talk over individual and community problems. What we wanted was a school plant which made possible opportunities for democratic processes and for developing leadership. To do this we knew that large and small auditoriums were required, social lounges were necessary and outdoor terraces would be highly desirable. Also, special rooms for school government were needed.

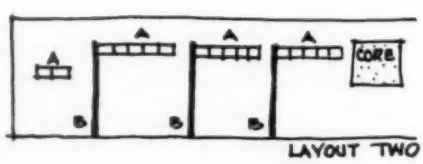


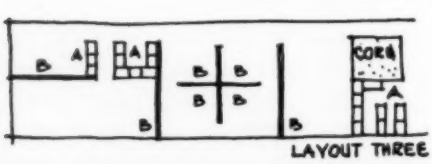
SPACE DIVIDING TEACHING PANELS

All of this required much more space than our community could afford—unless we could incorporate a quality of versatility into our architecture which would make certain spaces serve more than one function. After a great deal of study on how to obtain such versatility, our planning team arrived at a scheme for a combination assembly-band room building which allows for many activities. For example, this scheme provides for excellent seeing and hearing conditions for an audience of 600 people viewing and hearing as many as 250 performers.

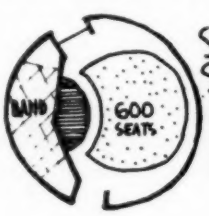
During the educational program stage it was decided that we have been building high school auditoriums wrong these past few years. As one member stated it, "most of our high school stages are copied after the legitimate theatre where at the most ten or twelve people perform. Our high school must have many more performers if we believe that more learning takes place behind the curtain than in front of it." In order to get this large stage within the scope of our pocketbook, we developed a scheme which provides for the conventional small stage to be adjacent to the band room. By the use of a folding partition the band room can be thrown open as a part of the larger stage during those performances which require many performers. This sort of versatility does not cost the taxpayers any extra money. The practice rooms of the band



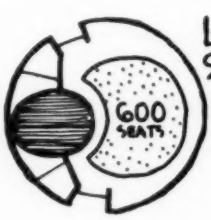




THIS SERIES OF SKETCHES SHOW THREE OF THE MANY ARRANGEMENTS WHICH THE EAST SIDE OF CLASSROOM WINGS CAN HAVE BY THE USE OF THE MOVABLE SPACE DIVIDERS



SMALL STAGE ACTIVITIES SUCH AS SMALL GROUP MUSIC, LECTURES, FORUMS, AND DRAMATICS — AND-AN UNDISTURBED BAND ROOM



LARGE STAGE ACTIVITIES SUCH AS MUSICAL FESTIVALS, FOLK DANCING, BAND AND ORCHESTRA CONCERTS.



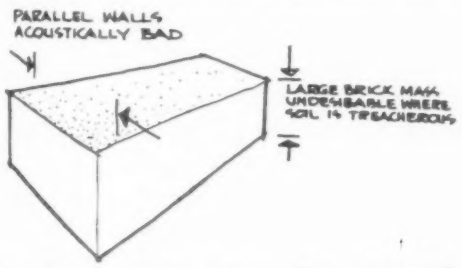
SPECIAL ACTIVITIES REQUIRING COMMUNITY PARTICIPATION SUCH AS COMMENCEMENT, CHRISTMAS PARTIES AND PAGEANTS. AUDITORIUM CAN BE INCREASED TO 850 CAPACITY. ALSO THIS ARRANGEMENT PROVIDES FOR THEATER-IN-THE-ROUND.

room are used as dressing rooms, another example of versatility. This scheme takes care of the graduation crowd, since the large stage can be used for audience seating. With such an arrangement the auditorium can be increased from 600 to 850–900 capacity. During a theatre-in-the-round program, this scheme can also seat over 800 people.

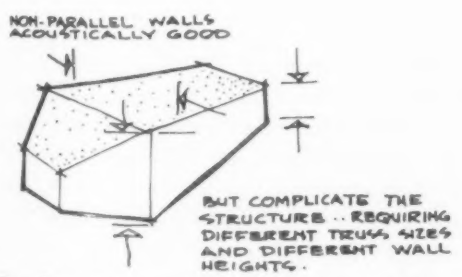
So in our attempt to incorporate this quality of versatility into our architecture, this is what we found. We do not think it is the perfect solution, but at least it is an indication to us that through very careful planning, versatility can be obtained economically.

Planning the Auditorium

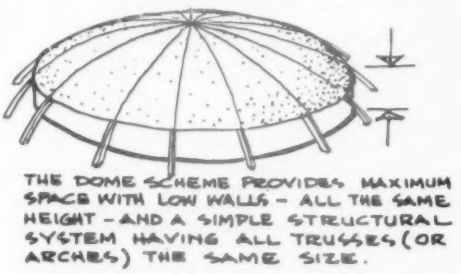
Generally, auditoriums are planned as large box-like cubes 40 feet high, 60 or 80 feet wide and so long—depending on the size. This is what we thought we would have, during the early stages of planning. In fact, the first sketch that the public saw of the auditorium was of a box-like arrangement. However, after our planning team got further into the problem, that arrangement for an auditorium did not make good sense. In the first place, the large parallel walls created



excessive sound reverberations. Our acoustical engineer, who was on our planning team, said the box auditorium was the worst architectural form we could have selected. In the second place, we found that to build this large brick mass building there was great risk involved because of shifting soil conditions. Drought in this section has resulted in the shrinking of the subsoil, cracking most of the large masonry walls in this area. The structural engineer on our planning team said, "Why can't we eliminate some of these large brick walls?"



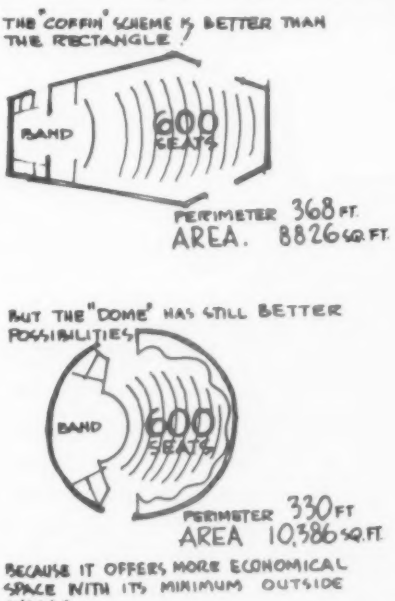
Our first step away from the box ended up in a floor plan that was shaped like a coffin. The form was suggested by our acoustical engineer. It also facilitated good seating conditions. However, after much study, it was found that it created many structural problems through necessitating walls of different heights and beams and trusses of different lengths. The next step towards a more functional shape gave us an architectural form that proved to have structural economy as well as acoustical desirability. It turned out to be a completely circular building that housed the auditorium and the band unit. From the standpoint of structure, all of the walls were the minimum height and exactly the same height, and all trusses were exactly



the same size. Through an arrangement of some economical interior sound baffles, good hearing conditions were assured.

An analysis of the floor area, which compared the circular shape with the coffin shape, cinched the circular dome shape building as our solution. Although the coffin shape building had a larger perimeter than the circular building (368 feet to 330 feet), it had a much smaller floor area than the circular building (8,826 feet compared to 10,386).

It has already been pointed out how this building can house many functions successfully. Now let us examine a construction detail which was effected by the philosophy of flexibility—the lighting system for the stage. We found the solution in what one of the planning team called the "spider web." It is a large web-



like circular steel frame that hangs from the ceiling directly over the stage on which innumerable arrangements of light can be plugged in to provide the desired

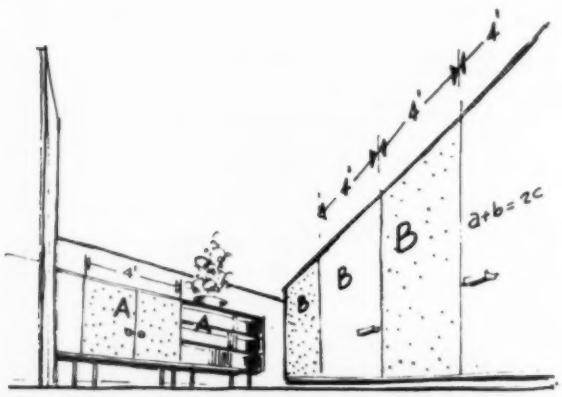
shape. From this frame also will hang the drapes, cyclorama and front curtains.

It might be pointed out here that the seating arrangement for this auditorium is not based on the conventional American style where the middle aisle is taking up the choice seats. Instead, our solution calls for the "continental plan" where each row actually is an aisle. We think that one highly significant fact in our auditorium solution is that the back row of seats is only 57 feet from the stage. We believe that the high school auditorium should be designed for high school children, not Broadway actors. It is difficult enough for experienced actors to project their voices and facial expressions in a small auditorium, not to mention children. In a large auditorium, children do not have a chance. We believe that, in this respect, our auditorium may even be too large for our high school program, but we had to compromise because our community needed a large meeting space.

It should be remembered that this auditorium is the solution to our problem, not necessarily to yours. Our point in describing it is not so much to tell you of the solution as it is to tell you of our approach in seeking this quality of versatility. We believe we found it in some small degree.

What, No Doors?

Now let's go back and examine the classroom wings and laboratory. Probably the outstanding differences between this school and your own is the fact that this school has no doors. But who ever heard of a school not having doors? Our solution calls for an opening entrance, of course, but swinging doors were eliminated after a study of classes in the existing plant revealed that all doors remain open during class periods. Elimination of the doors themselves was a saving. The real saving was in eliminating the labor cost of hanging and fitting the doors.



SPACE DIVIDERS MAY SUB-DIVIDE THE CLASSROOM AND LABORATORY WINGS IN MANY ARRANGEMENTS. UNIT "A" IS A STORAGE UNIT. UNIT "B" IS A TEACHING WALL UNIT.

Won't noise from the other classes interfere with some classes? No, it does not in the existing building where the doors are open. Won't noise from traffic in the corridor disturb classes? No more than it does in existing buildings, "Anyway, no students are supposed to be in the corridor during classes," the principal said. By having no doors we have a real opportunity to provide the flexibility which we are seeking.

Actually, our classroom and laboratory wings are subdivided by teaching devices. The 4 by 8 movable panels are vertical working surfaces. The so-called wall between the corridor and the classroom is not actually a wall at all. It is a series of mass-produced multipurpose cabinets and shelves arranged to form a barrier between the corridor and the classroom. Such a barrier can be moved in a few minutes to include the corridor as part of the class area if desired. Doors would only hinder this. The result is versatility as well as convertibility.

The wall panels cannot be moved as quickly, but it requires only a good custodian to move them. It should be pointed out here that the entire ceiling surface is covered with acoustical tile to cut down the sound level throughout the building.

Flexibility and the Utilities

What about the flexibility of utilities, such as hot and cold water, drainage and electricity to laboratory spaces. In order to take care of that problem, it was decided to have two teaching wings—one for the spaces which do not require these facilities, and the other for spaces that do. However, even in the classroom wing where these facilities are not required we do have a utility core which can supply adjoining spaces with water drainage and special facilities. Of course, throughout all spaces there are plenty of convenient outlets so that regardless of how the large space is subdivided, the small spaces will be provided with them.

Conclusions

This architect-superintendent team wishes to emphasize that our plant is only one solution; it represents what we think is a pretty good solution to our problem. We are sure that there is a better one. After the building is in use, we will be in a better position to tell just how good our solution is. But the solution isn't the important thing—it is our approach that is important. Equally as important is our philosophy of flexibility.

We are convinced that since we do not know what the future educational problem will be in our secondary schools, and since we know that our school plant must grow, the only answer to our secondary school housing problem must be found in a quality of flexibility. We are also convinced that flexibility is not necessarily expensive. So the hopes for a highly functional secondary plant look good to us, if school planners approach their problem with flexibility in mind.

CUMULATIVE RECORD FOR SCHOOL PLANTS



by GEORGE LARKE

Consultant in Field Service, University of California, Berkeley

A native of Connecticut, George Larke received his B.S. and M.A. degrees from Teachers College, Columbia University. After World War II he served two years as commandant of the Alaskan Branch of the U.S. Armed Forces Institute. Prior to his present work at the University of California, he was connected with San Francisco State College as an art instructor.

IN the recently completed California School Facilities Survey, sponsored jointly by the California State Department of Education and the U.S. Office of Education, it was found that 46 school districts in two counties had no system of records which would readily provide information concerning school plant facilities. To obtain information on such items as dates of plant construction, dates of additions to buildings, cost of remodeling or rehabilitation and sizes of classrooms, it was necessary to examine various files and records in several locations.

Some information was found in the central administrative office or in the individual office of the school plant being checked. Other information was filed in the office of the county superintendent of schools, the auditor or the tax collector. In one district information was finally found in the notebook of a gold mining employee whose hobby it was to jot down unusual events, in this instance, the year the school burned. Complete information on any part of the school plant was seldom available at a single source. Special trips were required to examine personally a school plant to discover sizes of classrooms when plans or blueprints had been misplaced or lost. Even in cases of recently completed school buildings it was necessary to spend time collecting the information from several sources.

Insurance information was also difficult to locate. Some districts kept an accurate record, others left it to insurance agents. For many this was a responsibility given to the office of the county superintendent of schools.

Help Needed to Compile Facts

In large districts most of the data on school plants were available in a central office. A few districts assisted in procuring information on their school plants by assigning a person to help the research technician. This speeded the job of collecting information from the district files and records. One large union high school district agreed to complete the information forms required for their school plants. They estimated a week to finish this work but needed almost two.

In both the large and the small districts turnover of administrative personnel created a problem. Very often superintendents or principals failed to leave records of important changes made in the school plant during their term of responsibility. In these instances those presently employed by the school district could only give an estimate or an opinion about the desired information.

A file or cumulative record of information on school plants, from the inception of the idea of planning the plant until the present, is possible by use of the School Plant Facilities Information form presented here. In addition to being a single source of basic information on the school plant the form serves as a location file of such important documents as: deeds, contracts, specifications, blueprints, school surveys, etc.

The basic form is a single sheet of durable white

SCHOOL PLANT FACILITIES INFORMATION

Name of School Plant DEER PARK ELEMENTARY Address FAIRFAX, CALIFORNIA

County MARIN District Name FAIRFAX, ELEMENTARY

A. CLASSROOMS[1] (pencil)

1. Number of Kindergarten rooms	1	6. Number or Homemaking rooms	
2. Number of Classrooms	7	7. Number of Bus. Ed. rooms	
3. Number of Art rooms		8. Number of Shops	
4. Number of Music rooms		9. Number of	
5. Number of Science rooms		10. Number of	

B. GENERAL-USE ROOMS[1] (pencil)

1. Number of Audio-visual rooms		6. Number of Medical rooms	1
2. Libraries		7. Number of Community rooms	
3. Auditoriums		8. Cafeteria	
4. Multi-purpose rooms	1	9. Number of Gymnasiums	
5. Swimming Pool		10. Number of	

C. GENERAL FACILITIES[1] (pencil)

1. Bus Garage		5. Office Suite	
2. Number of Maintenance Shops		6. Number of Individual Off.	1
3. Stadium		7. Number of Teachers rooms	1
4. Number of Playfields		8. Number of KITCHENS	1

D. SCHOOL PLANT SITE[2] (Ink or type)

1. Number of Acres 6.4 Purchased from MARIN MUNICIPAL WATER DISTRICT Date 2/50
2. Cost of site $ 12,920.00 Deed number recorded Date
3. Site gift of Date
4. Other site conditions CONDEMNATION PROCEEDINGS REQUIRED TO OBTAIN SITE

E. STRUCTURAL CHANGES OR ADDITIONS TO SCHOOL PLANT OR SITE[2] (Ink)

1. Report only changes or additions which add to the value of the school plant or site. Indicate briefly what was done, who did it, when it was done and the total cost.

(Sample entry: 2 classrooms added, 4/15/52, H. Crocker, $38,700)

Fld. Boar, glass wall, fencing and playground apparatus; 6/7/51; H. Crocker, $2116.00
Grading and Paving; 8/6/51; Jensen and Pitz; $9720.00
Multipurpose Room, 7/1/53; Jensen Construction Co; $80,388.00

1. Completed by architect for new building
1-2. Completed by school staff for old school plant

Suggested first page of the cumulative record.

paper, 11 inches by 17 inches, folded in the center to make four pages of 8½ inches by 11 inches. This can also serve as a file folder for additional separate sheets or other records which may be added from time to time. The Confederated School District (Fairfax, San Anselmo and Kentfield elementary schools) of Marin County, California, operating under one superintendent of schools, is using the School Plant Facilities Information form as a cumulative record for eleven elementary school plants of the three separate districts.

"Questions are often asked by trustees of the three boards about various details of the school plants," says Mr. Kenneth Forry, school superintendent. "The cumulative record on school plants will provide a ready source of information at board meetings."

Form Lengthened to Six Pages

In the large unified school of Mt. Diablo, located in Concord, California, the four-page cumulative record has been expanded to six pages. Information on utilities and services takes a full page. Here are listed the many subcontractors who completed the work on various parts of the school plant. Spaces for 24 subcontractors are provided, beginning with acoustical tile and concluding with ventilation. The other page covers essential information on insurance for the plant and equipment. The form is adaptable to the needs of a school district of any size or type and may be expanded or shortened as desired.

The basic four-page School Plant Facilities Information form contains eleven categories of school plant information. On the first page, besides name and address of the school building are the three principal types of constructed facilities found in most school plants. These are: classrooms, general-use rooms and general facilities. This part of the form is a check list and is completed by indicating the numbers of each type found in the plant. Space is also provided for write-ins of special classrooms or facilities.

Also on page one is space for school site information. Here are recorded the number of acres, from whom site was purchased, the cost, space for important dates and other site information. Space for entering facts on structural changes and additions to the school plant or site is also provided. Only changes which add to the value of the school plant are written in here.

Page two provides space for pictures of the school plant if desired. The suggested size of prints is 2¼ inches by 3¼ inches. These could be a useful reference as an aid to restoration in case of damage or destruction of any kind. The balance of this page is for data regarding maintenance, repair and replacement. The important points are: what was done, who did it, dates and total costs.

The floor plan of the building makes up page three. Important site features may also be included here. The suggested scale for small and medium sized

Utilities and services page of the form.

H. UTILITIES AND SERVICES[1] (Ink or type)

1. General Contractor (Sub Contracts)	H. CROCKER & Co. 1930 - 4th ST. SAN RAFAEL, CALIF.
2. Acoustical Tile	
3. Asphalt Tile	
4. Ceramic Tile	
5. Chalkboard	
6. Drapery and curtains	
7. Electric	L. H. LEONARDI ELECTR. CONST. CO. SAN FRANCISCO
8. Folding Tables	
9. Glass	
10. Hardware	
11. Heating	CURRIE HEATING CO. SAN ANSELMO, CALIF.
12. Kitchen Equipment	
13. Landscaping	
14. Lockers and Benches	
15. Maple Floor	
16. Painting	E. HANSEN, SAN FRANCISCO, CALIF.
17. Plastering	
18. Plumbing	E. ONGARO, SAN ANSELMO, CALIF.
19. Reinforcing Steel	
20. Roofing	
21. Sheet Metal	
22. Steel Sash	
23. Toilet Partitions	
24. Ventilation	
25.	
26.	
27.	

1. Completed by school staff

school plants is ½ inch equals 30 feet. Locations of meters and shutoffs of all service utilities such as water, electric and gas, should be shown on the drawing. For the larger school plant it may be necessary to use a larger sheet of paper for proper scaling of buildings and site. When this is necessary, the larger sheet of paper should be folded to fit the 8½-inch by 11-inch page.

Financial and Construction Data

Page four is for financial and construction information, providing space for such items as: cost of school plant, amount of money from state or local funds, type of bonds, dates of maturity and rates of interest, cost of building per square foot and where specifications and blueprints may be located. Utilities and services, also on page four, are recorded by entering the names and addresses of companies or individuals who have completed important contracts at the school plant. In the event of a serious breakdown, this section would provide information on the original contractors who might be called first because of their familiarity with the installation.

The concluding item of the cumulative record is called planning and historical information. Here may be put such facts as: dates of original entry in board minutes of the motion to purchase the site and to plan and construct the school plant, reference to school survey information, school district planning with such groups as local or regional planning commissions or with the state department of education, and the number of people of the community involved in the planning of the school plant. There is also space for listing the time required for planning and construction.

Form Easy to Prepare

A small district of one or several school plants could make the basic School Facilities Information form by attaching the typewritten sheets of the form to an ordinary file folder. Larger districts would probably wish to print the form on light cardboard (for durability since the life of a school plant is estimated to be at least fifty years or more) with additional sheets inserted to fit the requirements of the district. Information for or drawings of new buildings could be obtained from the architect probably without extra

A record of all insurance on the school plant and equipment can be kept easily and accurately on a form such as the one shown here. It is best to fill out this page in pencil so that changes can be made from time to time.

I. INSURANCE ON PLANT AND EQUIPMENT[1] (pencil)

1. Type BLANKET Company H.A. CHRISTENSEN and Co.
   Type ____ Company ____
   Type ____ Company ____
2. Broker or Agent's Name ____ Tel. ____
3. Policy number(s) ____
4. Policies filed (specify location) ____
5. School Plant appraised by ____ Date ____
6. (a) Total **Appraised** value of plant $ ____
   (b) Total **Uninsurable*** value of plant $ ____
   (c) Total **Insurable**** value of plant $ ____

   * . . . total **Uninsurable** value of plant is obtained by adding the cost of the foundations, **sales tax**, shrubs, underground piping, walks, etc. Subtract the total amount from the **appraised** value to obtain the **insurable** value.

   ** revise downward periodically on the basis of reappraisal of the school plant in order that the **insurable** value is adjusted for obsolescence and depreciation.

7. Amount of Fire insurance carried $ ____
   Amount of ____ insurance carried $ ____
   Amount of ____ insurance carried $ ____
   Total insurance coverage $ ____
8. Total **yearly** premium $ ____
9. Expiration date ____

INSURANCE ECONOMY CHECK-LIST (pencil)

1. Have checked on lower rates when insured boilers and other hazardous pieces of equipment are not in use ____ Yes ____ No ____
2. All risks and hazards which may increase insurance costs have been removed ____ Yes ____ No ____
3. Inventories are kept up-to-date ____ Yes ____ No ____
4. Have included installed fixtures as part of building in order to obtain lower insurance rates ____ Yes ____ No ____

1. Completed by school staff

K. FINANCIAL AND CONSTRUCTION INFORMATION[1] (ink or type)

1. Cost of School Plant $ 156,730** (When first opened only)
   (Note: To find the total cost to the present add the cost of the site to the total of all entries listed under E on page 1 to the cost listed above.)
2. Money from state funds $ 117,730** from local bond issue $ 39,000**
3. Type of bonds SERIAL Serial Numbers SEE COUNTY AUDITOR
4. Date of Maturity 1967 Rate of Interest 1.50 - 2.00 %
5. Number of blueprints 14 Filed (specify location) DIST. and COUNTY SUPT OFF.
6. Number of specifications 2 Filed (specify location) DIST and COUNTY SUPT. OFF.
7. Building cost per sq. ft. $ 14.00 (ORIGINAL BLDG. ONLY)
8. Space for other financial or construction information

L. PLANNING AND HISTORICAL INFORMATION[1] (ink or type)

1. Original entry in board minutes (page) Date SEPT 21, 1948
2. Was school plant a part of a survey of building needs? Yes No ✓
   (a) If "Yes", survey report is filed (specify location)
3. Was local planning commission consulted about purchase of site? Yes No ✓
4. Was State Department of Education advised of proposed site of acquisition? Yes No ✓
5. Was consultant employed by the district? Yes No ✓
6. If "Yes", Name of consultant
7. Participants in planning: Lay citizens 0 School staff 5 (certif.)
   School staff (non-certif.)
8. Planning time* required: months.
9. Building time** required: months
10. School plant dedicated (date) 10/7/51
11. Principal speakers J.F. McCARTHY, R. SHUNE, W.A. BLISS
12. Superintendent ROBERT V. RICKLEFS Principal
13. Space for additional information

1. Completed by school staff
* Time between entry in board minutes and "breaking of ground"
** Time between "breaking of ground" and official acceptance of buildings

Financial and construction information and planning and historical information may be recorded by use of this type of page for the cumulative record.

charge to the district. Other entries on the form may be made yearly by the school principal, school superintendent or other responsible school official, as changes in the school plants were effected. Any district can set up and maintain the cumulative record system without any great additional expenditure of time or funds.

What purposes will be served by adopting a cumulative record system? First, the record would make available as needed, accurate and up-to-date information on school plant facilities as an aid to the efficient and economical maintenance program. It would assist new school principals, school superintendents and other interested school personnel in evaluating the condition of school plant facilities. The cumulative record would provide basic information in a single source useful to planning other school plants in the district. It would be available for extensive schoolhouse planning in the county, region or state. Another principal value of the record would be its convenience as a source of information for the location of such school documents as specifications or contracts.

Uses Are Not Limited

The use of the School Plant Facilities Information form is not limited to the local district. It would also be of value to state departments of education. If the state and local districts would work together to develop a cumulative record form, all local school districts would have an opportunity to share in working out the most desirable plan. The state department of education could facilitate the process and offer the coordinating leadership necessary for achievement. State departments will periodically need to know the condition of school plants throughout the state. An established cumulative record system, operating on the local level, would speed the process of obtaining required information.

GOOD MAINTENANCE PRACTICES: A SYMPOSIUM

PROPER CARE FOR RESILIENT TILE FLOORS

by **WILLIAM MUELLER**

Chief Floor Engineer, Kentile, Inc.

MANY schools have discovered the economies to be derived from the installation and use of resilient tile flooring. This type of flooring is in great use because of its low initial cost, easy upkeep, decorative possibilities and high resistance to fire. General cleaning costs are cut down with asphalt, rubber, cork and vinyl tiles and their durability is unsurpassed.

Correct maintenance practices in the care of resilient tile floors will result in low maintenance costs. For best appearance and protection it is advisable to use the cleaning, sweeping and waxing products especially developed for these floors by the manufacturer.

Asphalt and Rubber Tiles

After the installation of asphalt or rubber tiles the room temperature should be at least 70 degrees for a period of three days. The floor should not be cleaned or waxed for 48 hours. If a sweeping compound is used, it should be a wax base compound that will pick up dust and leave a protective film on the floor. Oil base compounds are apt to soften the tile and smudge colors.

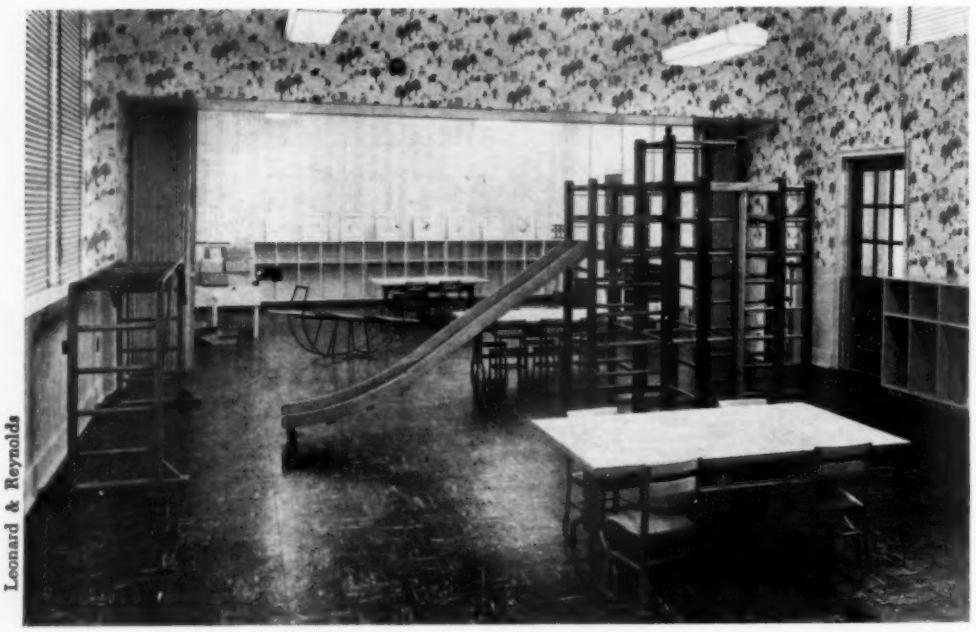
When the floor becomes soiled, remove dirt and old wax by washing with warm suds of a neutral soap free of lye, soda ash, trisodium phosphate, sodium metasilicate or pine oil. Recommended is a product with a high percentage of pure cocoanut oil soap. Gasoline, turpentine, benzine or other mineral spirits should be avoided. After washing, rinse with clear cold water, then dry with a mop.

Scuff marks and cigarette burns can be removed by rubbing lightly with a damp cloth sprinkled with ordinary kitchen scouring powder. Follow with a clear water rinse. If blemishes persist, a light buffing with fine steel wool will usually complete the job. However, do not make a regular practice of cleaning with scouring powders.

An occasional waxing will maintain the brand new luster of asphalt and rubber tile floors for years. After the floor is cleaned, apply one or two coats of water emulsion wax with a good commercial wax applicator.

Correct care of resilient tile floors results in easy upkeep.





Leonard & Reynolds

Asphalt tile floor of this nursery play and rest room, Bruce R. Anderson, architect, requires only an occasional waxing to maintain its brand new luster. Nursery room is located in the Training School of Arkansas State College at Conway.

For a high gloss, the wax should be buffed after it is dry. One gallon of wax will cover about 2,000 square feet of floor. Paste wax or waxes containing mineral spirit solvents are to be avoided, as are varnish, shellac or plastic sealers.

Cork Tile

Because a specially prepared wax is applied to cork tile at the factory, a simple buffing is all that is required to polish the floor after installation. From then on under ordinary usage only occasional washing, waxing with paste wax and buffing are needed to keep the floor like new. If sweeping compounds must be used to hold down dust, the same wax base compound may be used as described above for asphalt and rubber tile.

In cleaning cork floors, mop a small section of the floor with a neutral soapsuds solution. Rinse the mop in a second pail of clear water and wipe the section clean before proceeding to another. This avoids flooding the floor. Strongly caustic or alkaline soaps are to be avoided because they attack the natural cork resins which bind the particles.

The floor must be thoroughly clean and dry before waxing. Apply a thin coat of paste wax especially formulated for cork flooring. Let it dry fifteen to thirty minutes, then polish with a weighted brush or polishing machine. Doorways and other paths of concentrated traffic can be waxed as required, without rewaxing the entire floor. Floor oils should not be used, as they cause a dark, greasy film that collects and holds dirt.

Cork tile floors are impervious to most surface stains and smudges. Those marks which are difficult to rub off, however, such as cigarette burns, can be removed by light sanding with a small piece of sandpaper. Two coats of wax should be applied on the sanded spot, buffing each coat when dry.

Vinyl Tile

In order to allow the adhesive to set thoroughly, no maintenance should be done on vinyl tile until about a week after installation. At this time it should be softly buffed. To clean, use a semi-wet mop with a light application of household soap or cleaner. If the floor is very soiled, a steel wool buffing with steel wool pads or discs will restore its smooth, clean surface.

Unless an especially high gloss is desired, it is not necessary to wax a vinyl tile floor. Frequent waxing may cause a surface build-up and an accumulation of grit which will necessitate removal by steel wool buffing. If a high gloss is desired, apply a thin coat of good liquid wax. Buff the floor a half hour after the wax has dried. Hard coatings like lacquer and plastic should be avoided. Because vinyl tile is nonporous it will not grip these coatings and they are likely to peel in heavy traffic areas.

Casters, Glides and Cups

Important in preserving all types of resilient tile floors is the proper use of casters, glides and cups on furniture. Domes with small bearing surfaces can leave unsightly indentations. Narrow tread, small diameter casters should be replaced with large, wide tread casters. The caster should be at least ⅞ inch wide and 2 inches in diameter for a piece of furniture weighing up to 250 pounds; and at least 1¼ inch wide and 3 inches in diameter for heavier pieces.

Glides with convex or concave bearing surfaces

should be replaced with flat glides. Preferable are glides having a cushion of rubber or other material between the metal glide and the end of the chair leg.

If a chair leg is too thin to take a glide or caster, the bottom of the leg should be square and smooth. To minimize injury to the floor when the chair is tipped back, the rear edges of the back legs should be rounded off with a chisel or file and sanded smooth.

Furniture that is moved frequently should be equipped with ⅞-inch treads and 2-inch diameter ball bearing rubber casters. Soft rubber is preferable as it spreads, creating a wider bearing surface. Casters should be kept well oiled and occasionally scraped with a knife to remove accumulated dirt and grit.

PAINTING MAINTENANCE THROUGH CONTRACTORS

by C. C. CRAWFORD

Secretary-Business Manager, Board of Education, Kalamazoo, Michigan

UNTIL two years ago it had been the practice of the Kalamazoo, Michigan, school system to hire a crew of painters to work continuously in the schools to carry out our redecoration and renovation program. As an experiment we decided to try letting out these jobs on bid, according to specifications drawn by our buildings and grounds department. Bids were sent to all painting contractors in the city. It was found that four contractors were desirous of quoting on such jobs as we had available.

Success of the Program

After two years of accepting bids and letting out painting jobs to outside contractors we have discovered several advantages to such a plan. It has been found that the work can be done during the summer months when school is not in session, creating no disturbance of school work during the school year. We do not now have the problem of hiring efficient help and the supervising of such help with all the accompanying headaches.

Above all, this new method has proven to be a cheaper way of having our painting maintenance program accomplished. The only disadvantage to the program is the inability to get companies to do small painting jobs which arise at intervals.

Provisions of the Plan

Under this plan we furnish the paint, caulking compound and other materials which are bought on a bid basis. The contractor furnishes labor and equipment, including brushes. Ceilings are sprayed and sidewalls are pressure rolled. During the past two summers we have done the interiors of eight buildings and the exteriors of ten buildings.

We feel that this program of painting maintenance for our school system has paid dividends and is very satisfactory.

GARAGE PROCEDURES IN TORONTO

by C. H. R. FULLER

Business Administrator and Secretary-Treasurer, Board of Education, Toronto, Canada

WE keep a daily operating record of all automotive equipment in the Toronto school system, showing gas and oil and date when inspected. The cars, trucks and buses are inspected on a definite schedule once a month or every 1,000 miles. This is a complete inspection, including motor tune-up, greasing, oiling, brake testing and seeing that the vehicle is in perfect working order.

The drivers of cars, buses and trucks make out a daily report form. If any defects are reported, the garage superintendent makes out an interim mechanical report which is turned over to the garage mechanic. He reports back to the garage superintendent when work is completed.

Permanent Record Is Kept

In addition, a permanent record of maintenance work done on all automotive equipment is shown on a

DAILY OPERATING RECORD

FOR MONTH OF _____ 19

VEHICLE NO._____					VEHICLE NO._____					VEHICLE NO._____				
Date	ODOMETER FINISH	Miles	Gas Gals.	Oil Qts.	Date	ODOMETER FINISH	Miles	Gas Gals.	Oil Qts.	Date	ODOMETER FINISH	Miles	Gas Gals.	Oil Qts.
1					1					1				
2					2					2				
3					3					3				
4					4					4				
5					5					5				
6					6					6				
7					7					7				
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THE BOARD OF EDUCATION
TORONTO
MAINTENANCE DEPT. — TRANSPORTATION DIVISION

Date SEP 14 1953 19 License No.

The following items have been issued out of GARAGE STORES:—

Quantity	DETAIL	Price	Amount
	Gals. No. 1 Gasoline		
	Gals. No. 2 Gasoline		
	Pints Grade.....Oil		
	Pounds Grade.....Grease		
	Pints Anti-Freeze		
	Parts:		
	Total		

For Office Use Only

Priced by.....

Posted to Stock Record.....

Dr. Expense A/c

Issued by.....
Transportation Clerk

Received by.....
Chauffeur

Two of the forms employed by the Toronto, Canada, Board of Education in the operation of its school cars, trucks and buses. Forms such as these help keep track of usage and costs.

work card, giving date, speedometer reading and description of work done.

For the purpose of keeping track of gas and oil usage, the garage clerk makes out a requisition stating items issued from garage stores. This is entered in the records by the accounting department for cost purposes and for an inventory which is taken once every month.

There is a truck work report made out daily by the truck driver. Time sheets are made out for drivers as well, showing the day-by-day time record for pay purposes. A summary is made every month for record purposes.

BOILER WATER SERVICE AND TREATMENT

by ARTHUR A. KNOLL

Business Manager, Public Schools, Long Beach, California

LONG Beach, California, for many years had little difficulty in the preservation of its steam and hot water boilers because of the particular quality of the water in the area. With the advent of Colorado River water, however, our problem has increased materially and we have had to give special attention to treatment of the water used in our boilers.

After considerable consultation we have prepared a specification which has received wide acclaim and which is being used by some engineers with our permission. Within this specification it is stipulated that the contractor provide all labor, materials and other services required to furnish boiler water supervisory service and treatment as outlined below.

As it is required of the successful bidder that there be no deterioration to the water and steam side of the boilers, he has the right to inspect the boilers to determine for himself their actual condition at the time of commencement of service under the contract. Any adverse conditions noted by him are reported in writing to the maintenance director before servicing is started under the contract. The boiler water service and treatment contractor is not held for any adverse condition which cannot be seen from manhole or other inspection points, or where none of these inspection points are provided in the boilers.

All the boilers are used for heating buildings, with the exception of boilers used in the central kitchen cafeteria and Wilson cafeteria where steam comes in contact with food. Chemicals used at these

two places must not affect food, must be non-toxic and must not cause a taste or odor.

Scope of Work

It is the intent of the specification that the successful bidder provide a combination of chemical treatment and personal supervisory engineering service sufficient to prevent scale formation, pitting and corrosion on the interior surfaces of the boilers; scale formation on the interior of boiler feed lines and feed pumps; and pitting and corrosion on the interior of steam and return lines and auxiliary steam equipment due to dissolved oxygen in the boiler feed water.

Where active pitting already exists, the treatment must stop such action in not over ten days. Where scale is already formed, the treatment must disintegrate it so that it can be easily removed. Metal surfaces must be entirely free from crystalline scale deposit in not over 1,500 hours of operation. The boilers are to be maintained in this condition during the term of the contract as long as proper mechanical operating conditions are maintained by the operating personnel.

Materials Used

No restriction or limitation is placed on the successful bidder in the use of the chemical or combination of chemicals which he may select for treatment except for the following:

Materials used are to contain no ingredient or combination of ingredients which will cause discoloration of the treated water to such an extent that it is not readily filterable with ordinary filter paper, and must be such that standard titration methods can be readily used for determining the phenolphthalein and methyl orange alkalinities.

Material is to be such that the treated boiler water conforms to the following tests after a maximum of 150 hours of boiler operation and at all times thereafter during the term of the contract: phenolphthalein alkalinity not less than 6.0 or more than 20.0 grains per gallon; methyl orange alkalinity not less than 9.0 or more than 30.0 grains per gallon; excess caustic content not less than 3.0 or more than 10.0; and at no time must the caustic content be greater than 50 percent, or one-half of the total alkalinity; hardness not to exceed 0.5 grains per gallon; all readings to be dependent on blowdown conditions and boiler water dissolved solids to be maintained at 60 minimum and 120 maximum grains per gallon.

These limitations govern in all cases except where the water may be of embrittling type. In such cases the successful bidder must prove by a competent laboratory analysis that such conditions exist. These stipulations regarding alkalinities may be waived in individual cases, but the successful bidder is required to prove the use of recognized procedures of chemicals to prevent the possibility of embrittlement.

An exception is also made in the case of scaled boilers during the first 1,500 hours of operation when alkalinities higher than the above stipulation are allowed.

Examinations and Tests

The successful bidder, at the beginning of the contract, must give specific instructions to each operator in writing and in person regarding the use of the treatment. To assure proper performance in accordance with the specification, examinations and tests are to be conducted for the duration of the contract at no more than 30 nor less than 21 calendar day intervals. The schedule of examinations and tests is as follows:

1. During all months of the year. (Here is shown the administration building which operates throughout the year along with the high schools at which we have swimming pools operating all year.)
2. During the months of September, October, November, December, January, February, March, April, May and June. (Here is shown the central kitchen cafeteria which operates beyond the part of the year in which heavy operation is carried on in the school.)
3. During the months of November, December, January, February and March at all other boilers listed in the specification. (Here are shown all school boilers not included in the above groups.)

During inspection periods the school district mails samples of boiler waters to the contractors for the required tests and examinations. Sample bottles and all postage are furnished by the contractor. If he so desires he may pick up samples of boiler water at the school plants. Reports of each call, all tests and recommendations are given or mailed to the operator with copies mailed to the maintenance director of the school district.

Full Cooperation Given

The boiler contractor is given full cooperation by the Board of Education and its employees concerned. Inspection of boilers may be made by the successful bidder prior to starting treatment, during the Easter vacation period and at the end of the school year. Three days are available for inspection during the vacation period. If additional inspections are advisable, the Board of Education provides for them at no cost to the successful bidder. However, he is required to make a written request of the maintenance director who then advises him when the boilers will be open for additional inspection.

Easy access to the boiler plants is given at all times during the usual opening hours of school. The Board of Education maintains and installs adequate feeding arrangements for introduction of the treatment

where necessary and also provides safe and convenient arrangements for obtaining samples of boiler water. When required, samples of boiler water are mailed to the laboratory of the successful contractor at his own expense.

When special types of compound feeding or water treating devices are required, such apparatus must be supplied to the Board of Education for installation. Such special equipment remains the property of the contractor, returnable to him within 30 calendar days after termination of the contract.

The successful bidder also furnishes necessary chemicals, instructions and supervisory service for laying up boilers at the close of the heating season to prevent corrosion.

Forced Hot Water Systems

For the treatment of heating systems using forced hot water boilers or heat exchangers, where very little or no make-up water is required, treatment is introduced directly to the boiler or heat exchanger in sufficient quantity to maintain the following conditions:

a. Boiler water pH value not less than 8.0 or more than 9.0.
b. Chromate concentration not less than 20 grains per gallon nor more than 50 grains per gallon.

Terms of Payment

When recommendation for method of treatment is received and material for such treatment has been delivered to all schools under the contract, 30 percent of the contract price is due, provided the charge made for each school is furnished in the billing. If inspections made during the heating season show that the conditions of the contract have been complied with, the final payment is due at the end of the period of contract.

Cancellation of Contract

If the inspections made at any time show that proper results are not being obtained, the contractor is given 60 days in which to correct this condition. If, at the end of 60 days, inspections show that proper results are still not being obtained, that section of the contract applicable to such a situation is terminated on 30 days written notice by the Board of Education. No further payments are then made.

Qualification of Bidder

The bidder must have had an established business in successful operation for not less than the past five years, doing the type of work outlined in the specification. He must have the necessary training, equipment and personnel to do the work specified.

Attached to his bid must be a letter indicating the number of years he has been in the boiler water treating business, and a list showing not less than ten of his biggest and latest clients. He must also include the name of someone in his clients' employ who knows of the water treating service, and must indicate the type of work, when begun, boilers treated and approximate amount of the contract.

PROGRAM FOR PREVENTIVE MAINTENANCE

by GRAHAM R. MILLER

Assistant Superintendent for Business Services, Denver, Colorado

THE Denver Public Schools, in line with the modern conception of preventive medicine, have concentrated on the development of a preventive maintenance program which accomplishes the correction of minor defects before they reach epidemic proportions.

In order to put such a program into operation it is necessary first to provide a central point to which information from all sources can be channeled. The maintenance department, a component of the Office of the Assistant Superintendent for Business Services, serves as the collection agency.

Program Depends on Budget

The information comes from three sources: principals and department heads, foremen and an inspection engineer. The maintenance program by necessity is dependent upon the budget. Therefore, all information must be received and recorded at an early enough date to allow a thorough study with relation to importance and money available.

Information from principals and department heads is received on three forms and a description of each request is included. These forms are:

1. Alterations to structures.
2. Repairs to structures (building, plumbing, heating and lighting).
3. Upkeep of grounds, sidewalks and playground equipment.

The foremen of carpentry, painting, electricity, plumbing and heating, grounds and mechanical work



Daily check of light bulbs is necessary to keep all lights functioning.

encounter many items during the year which should be corrected or modernized. A record of these is made and submitted during the preparation of the budget.

Inspection of School Buildings

The inspection engineer acts in a dual capacity. He serves as a safety engineer and also reports repair work which should be done. An inspection of each school is made during the year. Due to the number of buildings involved, unless the inspection is systemized, it will tend by human nature to become lax. For this reason mimeographed one-page check lists have been provided covering walls, fire escapes, roofs, boiler rooms, toilets and storage, and classrooms and administrative areas. The Denver Public Schools are fortunate in having $\frac{1}{32}$-inch scale drawings of each building.

Prior to visiting the school a check list is provided for each room, including walls, ceiling, floor and light fixtures. As each area is inspected that room is checked on the plan. When the entire building has been inspected a report is written covering items of a minor or hazardous nature which are repaired immediately, and those which should be scheduled for future consideration. These reports are used in the preparation of the budget.

Work Schedule Is Set

When all information has been collected, estimates of costs and codes for accounting purposes are recorded. After the necessary adjusting has been accomplished and the budget for the coming year adopted, the work is entered in a planning book. Each job is given a tentative starting and completion date. Once a month a meeting of the foremen takes place and the progress made during that month is checked against the scheduled work.

Except for the handling of emergencies, the above procedure serves as the core of the maintenance program. Emergencies are handled by direct calls from the buildings.

SOME MAINTENANCE HINTS

by FRANCIS R. SCHERER

Architect, Superintendent of School Buildings, Rochester, New York

As school buildings have grown more complicated preventive maintenance programs, especially in the mechanical services, not only prove to be economical but avert actual shutdowns or discomfort to occupants. In Rochester, New York, our maintenance program for school buildings is effectively implemented by use of the following procedures.

Periodic Check of Electric Motors

There is a periodic check, at least annually, of all electric motors and starter control equipment in use throughout the school system. This is best done during the summer vacation when there is sufficient time to check motor bearings and drives and to examine the condition of the windings.

We have a continuing program of replacement of elements for our thermostatically controlled steam supply valves and for elements in the steam traps. Also, whenever horizontal tubular boilers are retubed, the insides of the shells are scaled and cleaned of rust.

Then a protective coat of paint is applied to the area.

When new fire brick linings are installed in the combustion chamber of existing boilers these linings are given a protective coating of ceramic paste. This paste forms a hard glazed surface and assists in preservation of the fire brick.

Because maintenance money is not sufficient to meet all of the needs of the school system we have established priority lists in the classifications of "urgent" and "necessary." The schools are informed of their position on the lists and are forewarned that emergencies may necessitate some change in that position. This has been found particularly helpful in such items as interior painting and rewiring, relighting and modernization of toilet rooms in all school buildings within the Rochester school system.

A FLOOR MAINTENANCE SYSTEM

by J. E. CREWS

Secretary-Business Manager, Waco Independent School District, Waco, Texas

THE Waco school system is comprised of 27 buildings consisting of three senior high schools, four junior high schools and twenty elementary schools. Of these, six are new buildings and all of the older buildings have been completely renovated, which included in part the covering of all floors with asphalt tile.

The maintenance of the asphalt tile floors is handled by specially assigned groups working under the direction of the supervisor of maintenance. The two groups are furnished with transportation for the equipment which includes scrubbing machines, wet pick-ups, buffing machines and materials.

Eight Hour Work Period

Each group is assigned certain buildings and completes its cycle each six to eight weeks. The day begins at 2:30 in the afternoon and continues until 11:00 p.m. with a 30-minute break for supper.

This system of floor maintenance has proven very satisfactory and we feel that with constant maintenance the life of the asphalt tile is appreciably extended beyond ordinary expectations.

Banbury



All floors, regardless of finish, should be kept clean. Waxing at regular intervals will help preserve the floors against wear.

DEVELOPMENTS IN SCHOOL TRANSPORTATION



by E. GLENN FEATHERSTON

Director, Administration of State and Local School Systems, U.S. Office of Education

E. Glenn Featherston received the degrees of B.A., M.A. and Ed.D. from the University of Missouri. He has served as teacher, high school principal and district superintendent of schools. After four years in the Missouri State Department of Education, he became a specialist for pupil transportation in the U.S. Office of Education. At present he is Director, Administration of State and Local School Systems, U.S. Office of Education.

IN 1951–52 about 7,765,000 pupils were transported to public elementary and secondary schools at public expense, an increase over the previous year of between 7 percent and 8 percent. The increase in enrollment in the same schools for that year was about 4 percent. More than 30 percent of all pupils enrolled in public elementary and secondary schools are now transported at public expense. Several things may help to explain this disproportionate growth.

In the first place, several states have been conducting active programs to reduce the number of small administrative school units. One state has eliminated 8,000 such districts in the last five years; another, over 4,000; and others have combined several hundred small districts. These reorganization programs almost inevitably result in a reduction in the number of attendance areas and bring about an increase in the number of pupils transported, even though there is no change in total enrollment.

A second factor in this growth is the increase in state funds available to cover the cost of pupil transportation. Several states have made substantial increases in allocations for paying the cost of pupil transportation. This has made it possible for local units either to initiate the service where it had not been provided or to broaden the service by use of more liberal standards governing its availability. A third factor is the gradual spread in the offering of a service which is still so new that many communities are only now accepting the obligation to make education available to all pupils through this means.

During the course of this growth the school bus fleet of the nation has increased to slightly more than 130,000 vehicles, of which more than 115,000 are



More than 30 percent of all pupils enrolled in public elementary and secondary schools are now transported at public expense.



Rollo

Number one safety rule for drivers following school buses is that no passing is permitted when a school bus is stopped to pick up or discharge passengers. Here traffic is piling up behind the bus as youngsters depart in safety.

buses. Almost 81,000 buses are publicly owned, while the others are under the ownership of private contractors. It probably may be presumed that most small vehicles are privately owned. Transportation service is now costing the schools more than $255,000,000 annually.

School Bus Standards

One of the early movements to increase safety in pupil transportation continues, with possibly greater study given to it than ever before. This is the effort to develop a fairly safe vehicle at a reasonable cost. The development of a set of national school bus standards, approved by all of the 48 state departments of education, was the first major achievement toward certain desirable uniformity in the administration of pupil transportation.

Beginning in 1939, three national conferences have devoted their attention to this problem. In 1952 a smaller conference developed tentative standards for the transit type bus. A fourth national conference is scheduled for the purpose of reviewing standards for both the conventional and the transit types of buses. This conference is being preceded by a series of regional conferences in which representatives of the states are discussing the need for changes in present standards. They also are proposing any additional problems which they feel should receive study and possible recommendation by a group representing all of the states. The materials from these five regional conferences will make it possible for the fourth national conference to devote its time to a well thought out improvement of present standards and to a carefully planned consideration of any other problems on which concerted action seems desirable.

Driver Standards and Training

While a great deal of attention has been given to improving the safety of the vehicle used in pupil transportation, equal attention has *not* been given to improving the quality of the drivers of these buses. One possible reason is that this problem has not been dramatized to the same degree as standards for buses have been by national conferences. The last national conference did suggest desirable minimum standards for school bus drivers, but few states seem to have been influenced greatly by these recommendations.

The reason is quite simple. There is no particular reason why one state should have exactly the same standards for school bus drivers as any other state, unless it can be shown that the standards for the second state are better. This would be very difficult. There is not the prospective economic gain in having all states maintain the same driver standards as there is in the case of school bus standards. Despite the lack of any urgent reason for uniformity there has been some improvement in the requirements for school bus drivers. A few states have set up simple standards, and several states have joined the ranks of those that require physical examinations for school bus drivers. General provisions for licensing chauffeurs and motor vehicle operators have been tightened up sufficiently in several states to eliminate the least desirable candidates from school bus driver jobs.

Some improvement may be noted also in the area of providing training for school bus drivers. At least

20 of the states now have continuing and well-organized programs for such training. The usual length of these training courses is between 8 and 30 hours. While only a few states have made such training compulsory, a number of others report that increasing numbers of drivers are taking advantage of the opportunity to better qualify for their jobs.

Financing Pupil Transportation

Some changes have been taking place in the financing of pupil transportation. While there are no more states furnishing funds for pupil transportation than there were five years ago, several have substantially increased the amounts allocated for this service. This has enabled many local units either to extend or improve service or both. Another development in financing the program is the re-examination in many states of the formula for measuring transportation needs of local units.

Many state-aid plans were originally of a flat grant nature without any consideration of justifiable variations in the cost. It is generally accepted that some local units cannot provide transportation service as economically as others because of different road conditions, differences in the density of the transported population and other such factors beyond the control of local school administrators. Therefore, if the state is to make allocations of funds on any basis of need, the formula for measuring need must in some manner recognize unavoidable variations.

Many states accept the principle of making apportionments for transportation in accordance with need, but the development of a sound formula is an involved statistical process which requires the collection of a great amount of cost data. Several states are now making such studies and hope to make necessary adjustments. Other states, having originally set up plans that did take into account the differences in transportation needs of local units, are engaged in studying these plans with the expectation that the more complete cost experience now available will enable them to judge the validity of present plans with more accuracy.

Transportation Insurance

There seems to be no marked trend in pupil transportation insurance during the last few years. If any is discernible, it is in the requirement of some sort of insurance either by law or regulation. The types which are most often required are liability insurance and property damage insurance. Insurance continues to be the most confused of all problems related to pupil transportation. Court decisions generally indicate the lack of liability on the part of the state's agents. Despite this fact, however, some states have been passing laws to require liability insurance.

Often these laws indicate that the state is not waiving its traditional immunity to liability. Rather, they require insurance companies to make settlement as if liability existed to the extent covered by the policy. It would seem that this is merely postponing the logical solution to this problem. It has been postponed year after year because it can be attacked only on a state-wise basis and, to date, most states have been faced with what they consider more pressing problems.

It will be necessary to consider three aspects of the insurance problem. The first is, what protection is necessary for the state or its employees in the light of present state law or court decisions, and what protection should the state give to its school pupils? The second is, how can a state best meet the obligation which it accepts with reference to its pupils? The third is concerned with features of the kinds of insurance necessary to meet the state's obligation and the cost involved. As has been pointed out previously, the question of insurance related to transported pupils should not be considered separately from insurance covering the whole field of pupil activities.

Records and Reports

Progress in gathering accurate and complete information on pupil transportation is slow. However, the national movement toward uniform information on education is moving forward. There is a group now



Transportation service for the nation's schoolchildren is now costing more than 225 million dollars annually. The bus fleet of the nation consists of more than 130,000 vehicles.

working on handbooks for a minimum core of information on education as a whole, on financial accounting, personal accounting and property accounting. Completion of the handbooks should bring a renewed emphasis on state revision of record and report systems to bring them in line with national recommendations. This will, of course, bring some benefit in making available uniform information with respect to pupil transportation.

A minimum core of information on education will contain only a few items on pupil transportation, however. These few items will be sufficient to give only an overview of the development of the service and will not furnish a basis for any extensive research on problems in the field. For this reason, information which will be helpful in changing procedures and practices with respect to pupil transportation must continue to be furnished by special studies.

Recent Interest in Research

A healthy sign is the recent active interest in research shown by state directors of pupil transportation services. The annual conference of supervisors of transportation of the twelve Southeastern states discussed this problem in both their 1952 and 1953 conferences. Their chief interest is to promote more work in graduate schools of education on problems related to the administration of pupil transportation. They began active efforts in the 1953 conference to devise a method of achieving this objective, and undoubtedly will receive cooperation and help from all sections of the country.

Almost from the beginning of pupil transportation service on a fairly large scale in the 1920's, people have been making an effort to compare one program with another or to use some sort of measuring device to point out the strong and weak points of the programs under consideration. This has been extremely difficult for two reasons. In the first place there has been little objective basis for measuring any element of the transportation program.

For example, prompt service is undoubtedly a desirable characteristic of any transportation program. But how does one go about measuring promptness of service? Consider the example of three drivers, all operating on a route schedule. One of them is practically never tardy on this schedule, one is occasionally tardy and the third frequently tardy. In what terms can this difference be expressed and how important is it in considering quality of programs? The second reason why programs of evaluation are difficult is that only by subjective judgment can we weigh the various aspects of the transportation program. How important is promptness of service as compared with obtaining a capable and well-trained bus driver? This again cannot be answered on the basis of any objective evidence.

Making Scoring Devices Valid

Recently, attempts have been made to bring up to date scoring devices which are useful in emphasizing transportation elements related to safety, economy, efficiency or adequacy. Since these must continue to be based in large measure on subjective judgment, maximum value will be obtained by using the judgment of as many persons who have worked in this field as is possible. It is to be hoped that eventually some way will be found to pool judgments on a nationwide scale for maximum validity and accuracy.



A STRUCTURAL MATERIALS

a. Exterior Walls

American Lumber & Treating Co.	**A a/1**
H. H. Robertson Company	**A a/2**
Alberene Stone Corporation of Virginia	A 12
Laclede Steel Company	A 13
Macomber Incorporated	A 14

b. Roofing

Barrett Division, Allied Chemical & Dye Corp.	A 15
Rilco Laminated Products, Inc.	A 16, 17
S. K. Insulrock Corporation	A 18

c. Skylights

Pittsburgh Corning Corporation	A 19

d. Windows

The Adams & Westlake Company	**A d/1**
Aluminum Window Manufacturers Association	**A d/2**
General Bronze Corporation	**A d/4**
The F. C. Russell Company	**A d/5**
Libbey-Owens-Ford Glass Company	**A d/6**
Marmet Corporation	**A d/7**
Cupples Products Corp.	**A d/8**
The William Bayley Company	A 20, 21
Tru-Seal Window Division, Industrial Machine Tool Co., Inc.	A 22
Windalume Corporation	A 23
Michael Flynn Manufacturing Co.	A 24, 25
Truscon Steel Division, Republic Steel	A 26, 27

e. Window Shades

Joanna Western Mills Company	A 28, 29
Columbus Coated Fabrics Corporation	A 30

f. Venetian Blinds

Levolor Lorentzen, Inc.	**A f/1**

g. Glass Block

Kimble Glass Company, Subsidiary of Owens-Illinois	A 31
Pittsburgh Corning Corporation	A 32

h. Waterproofing

A. C. Horn Corporation	**A h/1**
Standard Dry Wall Products, Inc.	**A h/2**
Structural Waterproofing Corp.	A 33
Brisk Waterproofing Co., Inc.	A 34
Western Waterproofing Company, Inc.	A 35

i. Paint

Endur Paint Co., Inc.	**A i/1**

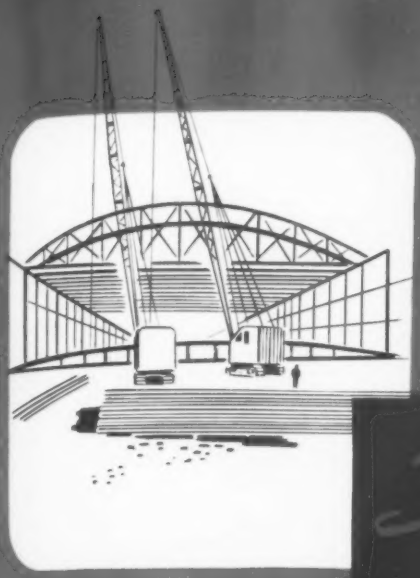
j. Weatherstripping

Accurate Metal Weather Strip Co., Inc.	A 36

Fund Raising Counsel

American City Bureau	A 11

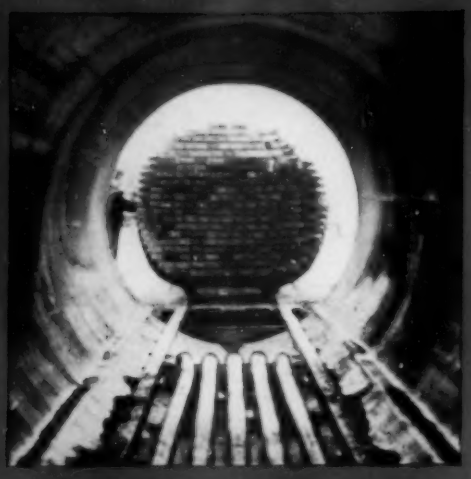
A a/1



School Construction of Wolmanized

PRESSURE-TREATED LUMBER

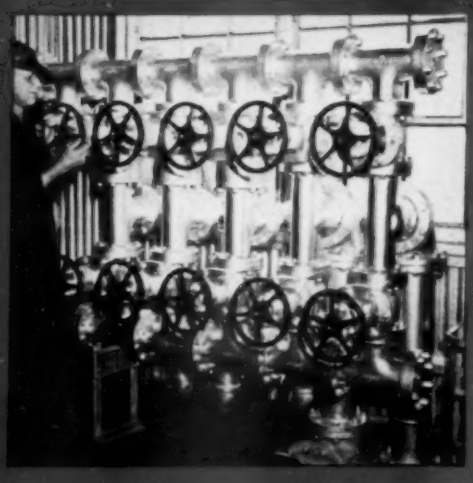




1.



2.



3.



4.

Wolmanized*...

THE PRESSURE-TREATED LUMBE

Deep penetration of chemical preservatives in wood is abso-
lutely necessary to assure protection against rot or termites. Brus
dip or other make-shift processes only coat the wood surfa
and cannot offer satisfactory protection. To date, the only pra
tical treatment used, which will force preservatives deeply do
into wood fibers, is the standard VACUUM-PRESSURE PROCES

Wolmanized treated lumber is treated in accordance with th
standard process. Wolmanized treated lumber can be expecte
to last three to five times longer than untreated wood in locatio
favoring decay fungi and termites. Wolmanized treated lumb
is clean, odorless and paintable. It is not corrosive to meta
Through the use of chrome, as a mordant, the chemicals rema
fixed to wood fibers and resist leaching. The treated wood ca
be glued with any good adhesive, including synthetic resin mix
tures. The treatment in no way affects strength, resiliency o
any other natural quality of wood.

The main element of a treating plant is the steel retort, 65 to 12
feet in length, built for pressures up to 250 p.s.i. Pumps, valv
and piping permit vacuum to be applied and high pressures
be developed which insure deep penetration of the fluid. Picture
here is a short review of the process in a wood treating pla

1. The Charge of Lumber Is Pushed Into the Cylinder . . .

the latter being made of 1" steel plate to withstand pressures to 250 p.s.i. Note the steam pipes on the floor . . . for heating the solution.

**2. The Door in the End of th
Huge Cylinder Is Bolted Shut . .**

a vacuum is pulled to dry th
surface of the wood and in
crease receptivity to treat
ment. Steam is sometim
used at this stage of the ope
ation to condition green woo
for treatment.

3. As Vacuum Is Held, a Solution of Wolman* Salts Heated to 140°F. Is Admitted to the Cylinder . . .

When the cylinder is full of solution, the vacuum is broken and the pressure is slowly increased to 150 p.s.i. to insure uniform penetration of even highly refractory pieces.

**4. Pressure Is Held While th
Solution Is Forced Deeply In
the Wood . . .**

Length of pressure phase va
pends on the species of woo
and penetration desire
Charge is then removed, co
taining thousands of gallo
of Wolman preservative.

*REG. U.S. PAT. OFF.

APPLICATIONS

Whenever moisture will set up conditions favorable to decay, or nearness to the ground invites termite attack, lumber needs preservative protection. When specifying preservative treatment, care must be given to the selection of the right preservative for the use intended. A preservative should be selected which will not in any way alter any of the natural characteristics of the wood. The following is a check list of six outstanding advantages which combine in WOLMAN SALTS to give lasting and economical protection to school construction. 1) CLEAN . . . Wolmanized lumber is never *oily*. Widely used for stadium seats, hand rails . . . any application where clean, attractive lumber is required. 2) ODORLESS . . . Wolmanized lumber is odorless . . cannot contaminate food in cold storage lockers. 3) PAINTABLE . . . Dry Wolmanized lumber will take paint as easily as untreated lumber. 4) NON-CORROSIVE . . . Wolmanized lumber actually retards corrosion of metal fastenings. 5) FIBER-FIXED . . . the protecting elements of Wolmanized lumber will not leach out during long exposure to weather. 6) GLUEABLE . . . Wolmanized lumber is excellent for making glue-laminated structural assemblies.



1.



2.

1. Sills Exposed to the Weather . . .

are always subject to decay caused by excess moisture settling in surface checks and cracks. For Stadium Seats, Bleachers and Grandstands always specify clean, odorless Wolmanized lumber.

2. In Contact with Masonry or Concrete . . .

wood is often subjected to severe decay conditions. Be sure to specify Wolmanized lumber for Sills on Concrete Foundations, Sleepers in Concrete Slabs, Wall Plates and Columns anchored in Concrete or Masonry.



3.

3. Subflooring, Joists and Foundations Over Unexcavated Areas . . .

are subject to extremely unfavorable conditions. For that extra protection to insure greater value and longer service life specify pressure-treated Wolmanized lumber.

4. Where Long Span Construction Affords Unobstructed Floor Space . . .

moisture and condensate may promote rot and decay. Avoid costly repairs by specifying Wolmanized lumber for the construction of Trusses and Roof Assemblies of Athletic Facilities where earth floors are left uncovered.



4.

Specifications

WOLMANIZED *pressure-treated* LUMBER

1) Lumber specified to be Wolmanized treated lumber shall be impregnated in a closed cylinder by vacuum-pressure process, in accordance with the specifications for treatment of American Lumber & Treating Co., with Wolman wood preservative (Tanalith)*.

2) Wolmanized treated lumber to be used in contact with the ground shall be kiln-dried, or air seasoned for a period of not less than 30 days, after treatment.

3) Wolmanized treated lumber which is to be painted or varnished shall be kiln-dried or air seasoned before painting.

4) Where it is found necessary to cut Wolmanized treated lumber on the job, two coats of prepared concentrated Wolman preservative salts solution shall be brushed on the cut surfaces.**

5) Each piece of Wolmanized treated lumber shall bear a brand denoting conformance to the standards of American Lumber & Treating Co.

***NOTE:** Unless otherwise specified, the amount of chemical recommended for normal exposure (0.35 lb. per cubic foot of wood) will be injected. For severe exposure or ground contact, specify 0.50 lb. For tropical or extremely severe exposure, specify 0.70 lb.

****NOTE:** The nearest source of supply for prepared concentrated chemicals for "Dope" solution used on field cuts can be obtained by writing American Lumber & Treating Co., Chicago.

ON-THE-JOB REQUIREMENTS

PRE-FRAMING . . . Where the timber is to be pressure-treated, pre-framing before treatment insures thorough protection at all joints and bolt-holes.

SITE-FRAMING . . . Where it is necessary to cut or bore Wolmanized lumber on the job, two coats of concentrated Wolman preservative solution should be brushed or swabbed on all cut surfaces immediately following cutting.

PLASTERING . . . When Wolmanized lumber is used as studs, nailers, or other members in contact with plaster, the edges of the wood touching the plaster should be sealed with aluminum paint or similar sealer, to insure against possible staining of the finish plaster coat.

PAINTING . . . Wolmanized lumber which is to be painted should be dry, and the surface should be dusted if excess preservative dust is present. Knots and pitch streaks should be sealed. Wolmanized lumber should be primed with a coat of aluminum paint before water-borne paints (calcimine, resin-vehicle, etc.) are applied.

SUBFLOORING . . . Where shrinkage in place is a serious fault, as in the case of matched flooring or subflooring, the treated lumber should be air-seasoned or kiln-dried to 15-18 per cent moisture content before installation.

SERVICE RECORDS

A recently published case history file on more than 55,000,000 feet of Wolmanized treated lumber details its use in 581 widely varied structures. Over 11,500,000 feet of the clean-treated lumber were in service more than twenty years, although used in conditions causing untreated material to fail in four to six years. The first Wolmanized installation in the United States, a textile dye house roof, is now 28 years old and still sound. Copies of the service record booklet will be furnished on request.

SPECIES AND GRADES

Most structural species of wood (Southern yellow pine, Douglas fir, Western pine, hemlock, cypress and redwood) are treatable. Hardwoods, with the exception of red oak and black gum, are very difficult to penetrate and should be avoided when specifying treatment.

The same regional association grade rules apply to Wolmanized treated lumber as to untreated wood.



AMERICAN LUMBER & TREATING CO.

GENERAL OFFICES: 332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

Baltimore 2, Maryland — 1203 Munsey Building
Jacksonville 2, Florida — 719 Florida Title Building
Los Angeles 17, California — 1118 Wilshire Boulevard
Portland 5, Oregon — 370 Pittock Block
Boston 9, Massachusetts — 141 Milk Street

Little Rock, Arkansas — 106 East Capitol Avenue
New York 17, New York — 420 Lexington Avenue
San Francisco 4, California — 1 Montgomery Street
Seattle 1, Washington — 414 Times Square Building

"WOLMAN" AND "WOLMANIZED" ARE REGISTERED TRADE MARKS AND ARE OWNED EXCLUSIVELY BY THE AMERICAN LUMBER & TREATING CO.



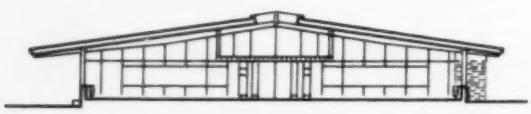
Robertson Products for Modern Schools



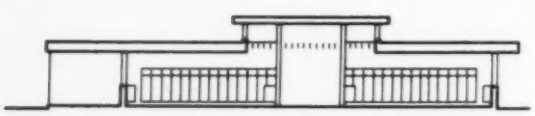




Now that the bulk of modern school design has arrived at the true economy and functionalism long enjoyed by industrial construction, Robertson quality products of metal and glass have entered the field in constantly increasing volume. Robertson Q-Deck, Q-Panel, skylights, sash and ventilators lend themselves admirably to the new trend detailed on these pages. Shown below are the basic new types, with Robertson products shown in detail on one example.



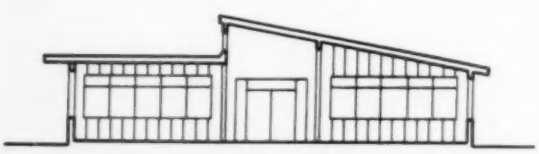
Low double-pitch type.



Flat type—with or without clerestory.



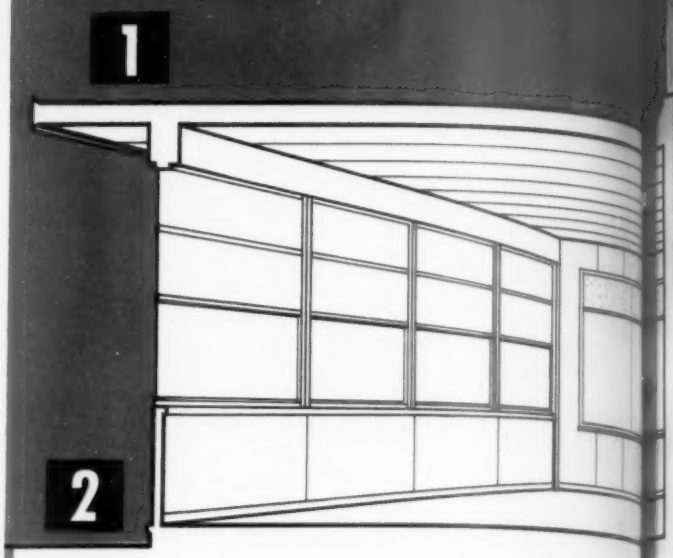
Reverse double-pitch or "butterfly" type.

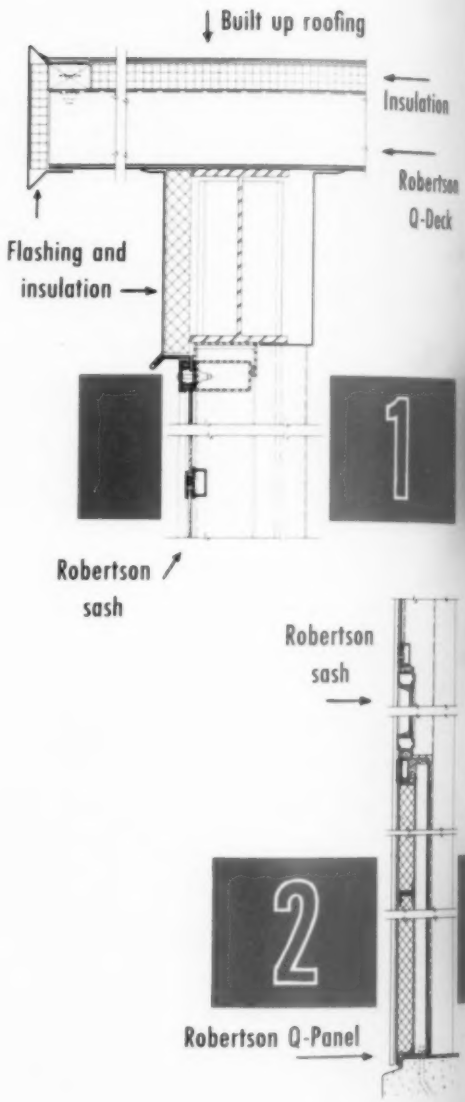


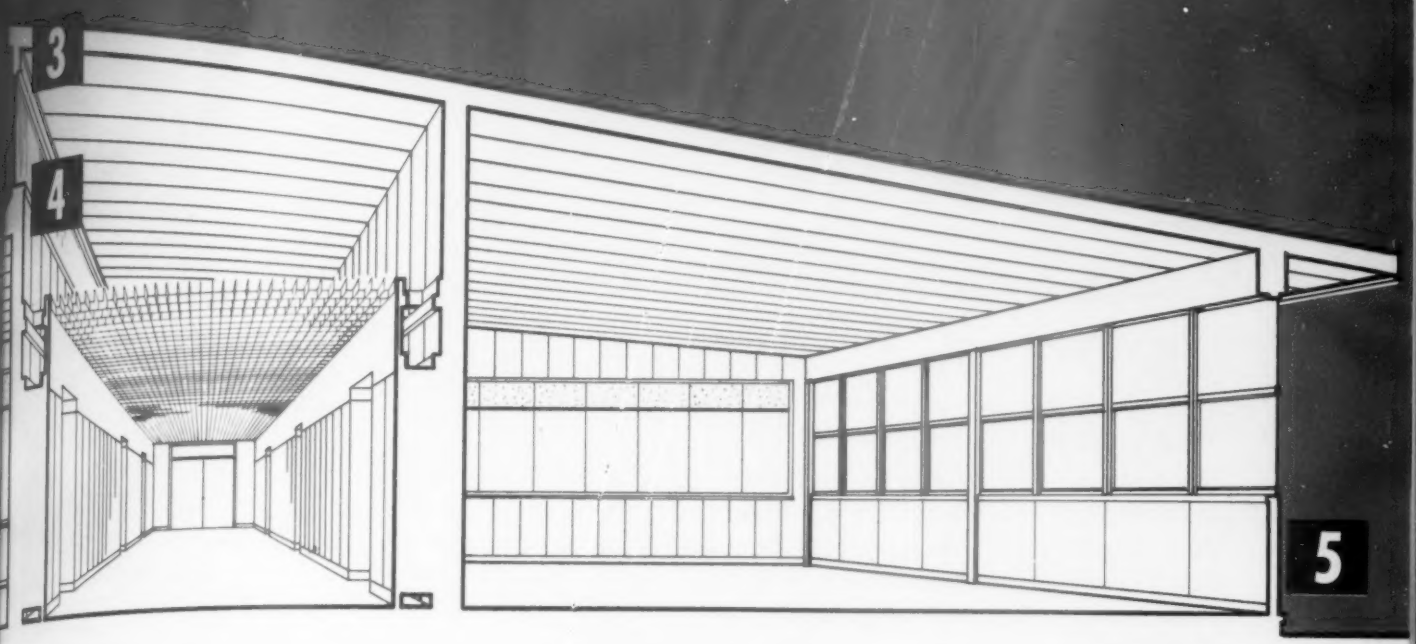
Single-pitch or shed type combined with flat area.

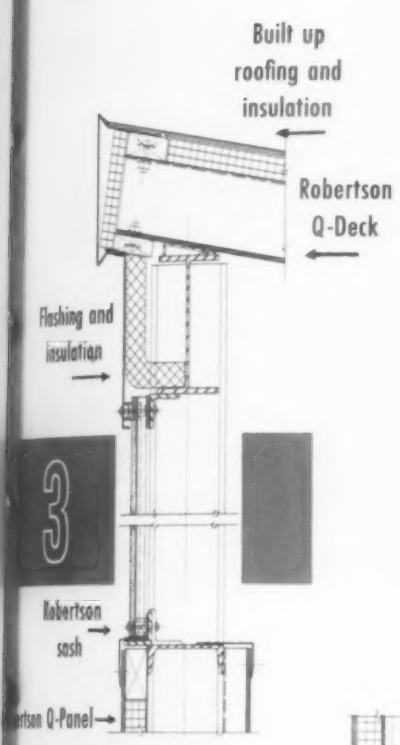
on the cover

Avalon Elementary School, St. Clair Shores, Mich.—H. E. Beyster & Associates, Inc., architects; Williamson Jr.-Sr. High School, Tioga, Pa.—Clarence Wagner, architect; East Side School, Moline, Ill.—M. R. Beckstrom, architect; Chestnut Ridge Joint High School, Fishertown, Pa.—James H. Kring & J. Richard Ross, architects.

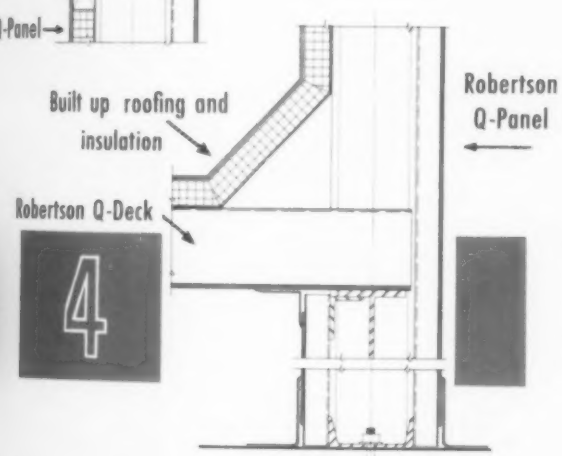


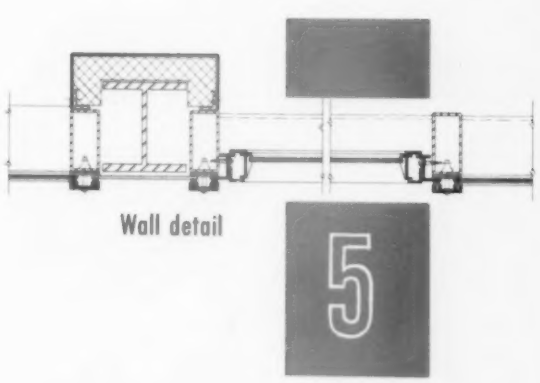



3
4
5


Built up
roofing and
insulation
Robertson
Q-Deck
Flashing and
insulation
3
Robertson
sash
rtson Q-Panel




Built up roofing and
insulation
Robertson
Q-Panel
Robertson Q-Deck
4


Wall detail
5

Robertson Q-Deck

ROBERTSON Q-DECK offers clean, dry, economical construction which lends itself well to modern functional design and requires virtually no maintenance over the years. It goes in place so simply and quickly that an acre of roof has actually been installed in one day. It responds very well to acoustical treatment. In fact, it has been found that the fluted underside surface of Q-Deck in itself provides considerable noise reduction without the application of any acoustical materials. Increased Noise Reduction Factors can be obtained by the Q-Method of acoustical treatment described briefly here. When the more expensive types of hung or applied ceilings are desired, they can be conveniently added to Q-Deck. Q-Deck is available in four types for various loads and spans as shown below.

Write for these books from Robertson's Technical Library:

1. Q-Deck Manual
2. Acoustical Data on Robertson Q-Deck



A special Robertson crimping tool mechanically fastens the side laps together, forming a steel fire barrier that remains intact as long as the structural supports are in place.



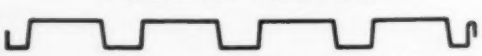
Ends of Robertson Q-Deck are sized and countersunk to produce a tight, smooth, two-inch lap joint. This lap, along with the right side laps, provides a vapor-sealed roof construction.



Excessive amounts of asphalt are eliminated on Robertson Q-Deck because the adhesive is applied to the *insulation . . . not to the steel deck.* This also results in a better bond between the steel and the insulation.

TYPES OF Q-DECK

NOISE REDUCTION COEFFICIENT



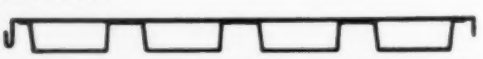
.13

No. 3. Economical for short spans (up to 10 ft.) carrying normal roof loads. Width: 2 ft., maximum length: 30 ft. Noise reduction coefficient .13.



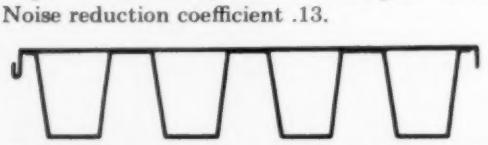
.24

No. 12. A long span unit economical for normal roof loads on spans over 10 ft. Width: 1 ft., maximum length: 25 ft. Noise reduction coefficient .24.



.13

UK. For spans up to 12 ft., offers fluted or flat ceiling. Cells may be used for electrical raceways. Width: 2 ft., maximum length: 30 ft. Noise reduction coefficient .13.



.24

FK. Economical for spans up to 20 ft., with flat or fluted ceiling. Cells may be used as electrical raceways. Width: 2 ft., maximum length: 30 ft. Noise reduction coefficient .24.

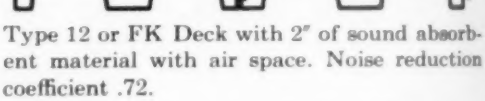
ACOUSTICAL TREATMENT

NOISE REDUCTION COEFFICIENT



.60

Type 3 or UK Deck with 1″ of sound absorbent material. Noise reduction coefficient .60.



.72

Type 12 or FK Deck with 2″ of sound absorbent material with air space. Noise reduction coefficient .72.



.90

Type 12 or FK Deck with 4″ of sound absorbent material. Noise reduction coefficient .90.

For areas where the more costly suspended ceiling is desired, any standard method of acoustical material application can be used. Noise reduction coefficients range between .70 and .90.



Q-Deck lends itself well to modern decoration as shown by this attractive corridor treatment in the Cedarville School at Cedarville, Ohio—John L. Kline, architect.



Long-span Q-Deck in a combination flat-deck and single-pitch roof brings extra light to a large classroom in the Cedarville School.



Cantilevered canopies of long-span Q-Deck become covered walkways at the Rocklin, California Elementary School—Gordon Stafford, architect.



Flat ceilings possible with types UK and FK are clean, easy to maintain and light reflecting as shown in this Newton County High School at Covington, Georgia—Gregson and Ellis, architects.



The long-span characteristics of Q-Deck are readily seen in this gymnasium application at the St. Edward High School at Lakewood, Ohio. George S. Rider Co., Architects and Engineers.

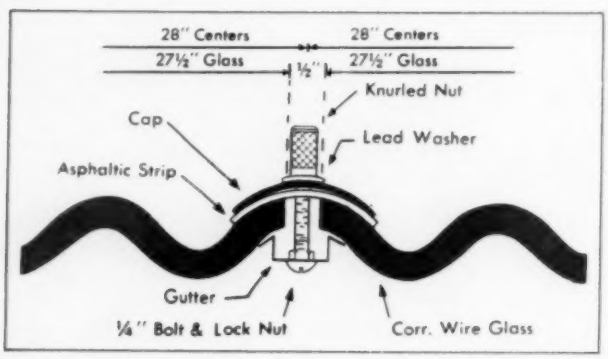


Acoustical material installed under Q-Deck in this manner provides 85% noise reduction at the Elmwood School at St. Clair Shores, Michigan—H. E. Beyster & Associates, Inc., architects.

Robertson

Skylights & Sash

The science of daylighting through the proper use of skylights and sash is no longer a hit-or-miss proposition in the modern school. Planned daylighting calls for the proper design and location of skylights and sidewall sash to provide peak utilization of non-glare light and maximum concentration at all working planes. Robertson's Engineering Service is complete in this respect. Robertson engineers have made exhaustive studies of school requirements and are prepared at any time to collaborate with school architects on the subject.







Continuous corrugated wire skylighting provides perfect light without glare in the corridors of the Newton County High School at Covington, Georgia —Gregson and Ellis, Atlanta, architects.

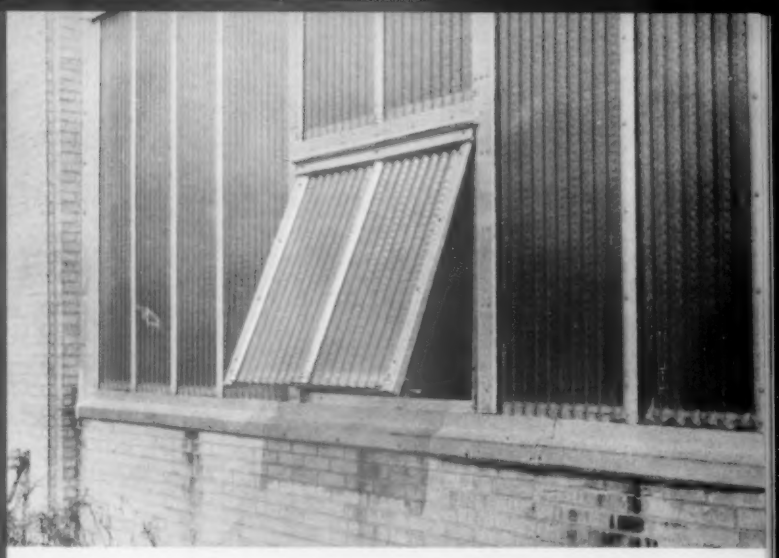


Vertical corrugated wire glass borrows light from clerestory for this attractive, well-lighted corridor in the George Washington School at East Moline, Illinois—M. R. Beckstrom, architect.

Write for Robertson Corrugated Wire Glass Skylight & Sash Catalog.



Again at East Moline, Illinois, "egg crate" construction transfers light from skylights to classrooms.



Light but not transparency was required of this laboratory wall at the University of Pittsburgh. Robertson corrugated wire glass panels provided the most economical solution.



Scientifically placed sheetlights provide daylight conditions without glare in this gymnasium-theatre at Mississippi State College, Starkville, Miss.—F. H. Johnston Jr. & T.S. Jones, associated architects.



Every corner of this gymnasium at the Herbert Hoover High School at San Diego, California comes into brilliant, glareless illumination through this combined use of skylights and clerestory sash.

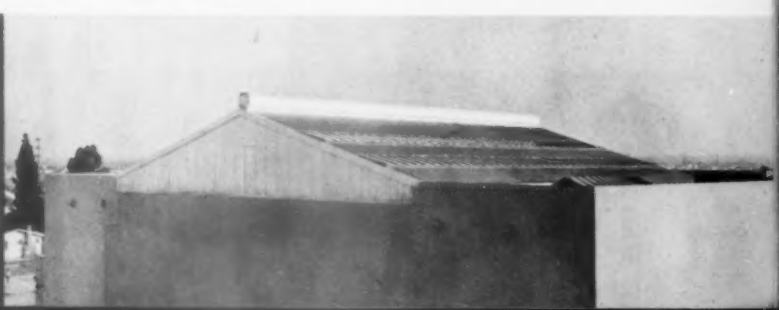
VENTILATORS

Like Daylight Engineering, Ventilation Engineering is a feature of Robertson service. There is a Robertson Ventilator for every conceivable school application, and Robertson engineers are available at all times to collaborate with school architects in determining the proper application. Shown here are two long Streamline or ridge-type ventilators in use. Write for the Robertson Ventilator Data Book.

Left below: the Manchester Grammar School at Manchester, Georgia.

Right below: the Herbert Hoover High School at San Diego, California.







This handsome administration building at the University of Michigan employed the use of strong, lightweight, cellular, steel Robertson Q-Floor—Harley, Ellington & Day, architects.

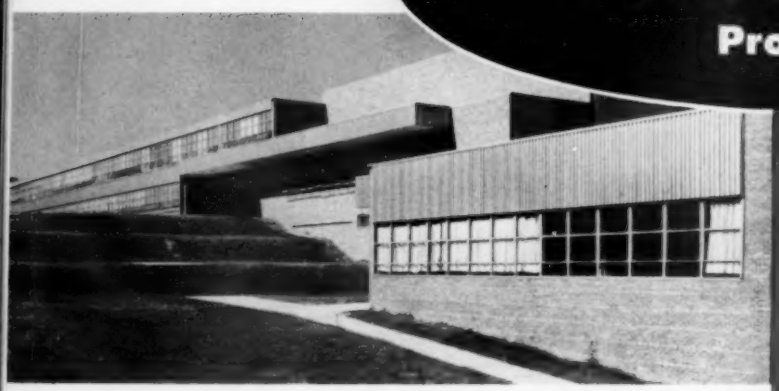


Because the cells of Q-Floor are used as electric raceways, this Electrical Engineering Laboratory at Ohio State University became a perfect application—Sims, Cornelius & Schooley, architects.

for today's schools

Robertson

Products



The clean, modern, decorative features of Robertson Q-Panel construction can be readily seen on this Shreveport, La. school—Van Os & Flaxman, architects.



Good use of economical, low-maintenance Robertson Q-Panel is shown on the sidewalls of the Carmichael school in Richland, Wash.—J. Gordon Turnbull, Inc., architects.



Q-Deck helped to make modern one-story design practical at the Elmwood School at St. Clair Shores, Michigan.



At the George Washington School at East Moline, Illinois elevations of classroom wings facing south have 4′ roof overhang. Robertson skylights on monitor daylight both classrooms and corridor.

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Alberene Soapstone is a natural quarried stone of medium hardness, having an abrasive hardness factor of ±6. Its blue-grey color harmonizes well with any decorative pattern, and its durable, moisture-proof surface does not chip, scale, or split. Alberene Soapstone is easily machined—bored, slotted, grooved, tongued, turned—without splitting or spalling. Its ability to be cut into thin sections makes for definite economies.

Interior Uses	*Exterior Uses*
Window stools	**Mullions**
Toilet partitions	**Spandrels**
Shower compartments	**Window sills and trim**
	Coping

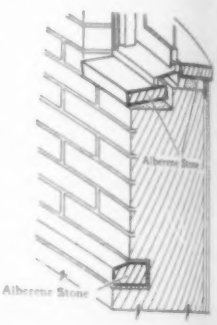
ALBERENE "DARK STONES" (SERPENTINE AND TREMOLITE)

Alberene "Dark Stones" are especially desirable for exterior use because of their great resistance to weather action, their durability and their excellent retention of polish. Alberene Black Serpentine takes a high polish that is essentially black with a slight greenish cast. Alberene Tremolite polishes to give a color tone varying from blue-grey to blue-black. Both Serpentine and Tremolite are exceedingly dense and homogeneous in structure, free of cleavage planes, and have a fine grain. When machine tooled they hold sharp arrises. They are tough, as distinguished from brittle, and highly abrasion resistant (abrasive hardness factor for Serpentine is 35—45; for Tremolite, 20—30). Their ability to be cut into thin sections—⅞", 1¼" is normal—makes for definite economies. Both stones are obtainable in comparatively large sizes at reasonable cost. For interior uses, Alberene "Dark Stones" are valuable wherever a dark, durable material is called for.

Interior Uses	*Exterior Uses*	
Stair strings and risers	**Mullions**	**Bulkheads**
Base and border	**Spandrels**	**Facing**
Window stools	**Window sills and trim**	**Coping**
Door trim		

ALBERENE STONE SILLS AND STOOLS

Both Alberene Soapstone and Alberene Serpentine are ideally suited for window sills and stools. Both stones are weather-resistant and free of maintenance cost. They have no cleavage planes, are dense, non-absorbent, and chemically resistant. Color of Regular Grade is silver grey in rubbed finish and a pleasing blue grey when honed—harmonizes well with almost any color scheme. Where a darker color is desired, we suggest Alberene Serpentine. It is a darker grey in rubbed finish, black when honed, and black with a slight greenish cast when polished. On the exterior (sill), where abrasion resistance is not a major factor, we recommend Regular Grade. For the interior (stool), we recommend Serpentine because of its higher abrasion resistance and more attractive finish.





Typical architectural use of Alberene Stone—window mullions and facing in a modern school building

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Light, easily handled, prefabricated to speed the job.

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Laclede steel joists combine efficient structural function with architectural versatility.

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Laclede Steel Joists assure you more room at less cost. Their high strength plus light weight provide substantial savings in foundation and framework. Utility conduits, pipes and lines are easily threaded through the open webs.

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1. Standard Bay Sizes to layout classrooms, corridors, administration offices, boiler room, cafeteria and auditorium or general utility room—utilizing every modern school design feature.
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6. Existing design studies of school modules designed for repetition within a school area or at the same site expanding into "L's," "T's" or "U" shaped layouts at a known price per module.
7. A structural system taking advantage of the long spans engineered over a period of years for industrial buildings and available today as a perfected framing material coinciding in every way with building codes, fire-safety and modern school design—all from standardized, cataloged structural members.

This system of interlocking structural members requires a minimum of equipment and skilled labor to erect. It provides for varying heights of roof over some portions of the building where recreational or high mechanical testing equipment requires additional height.

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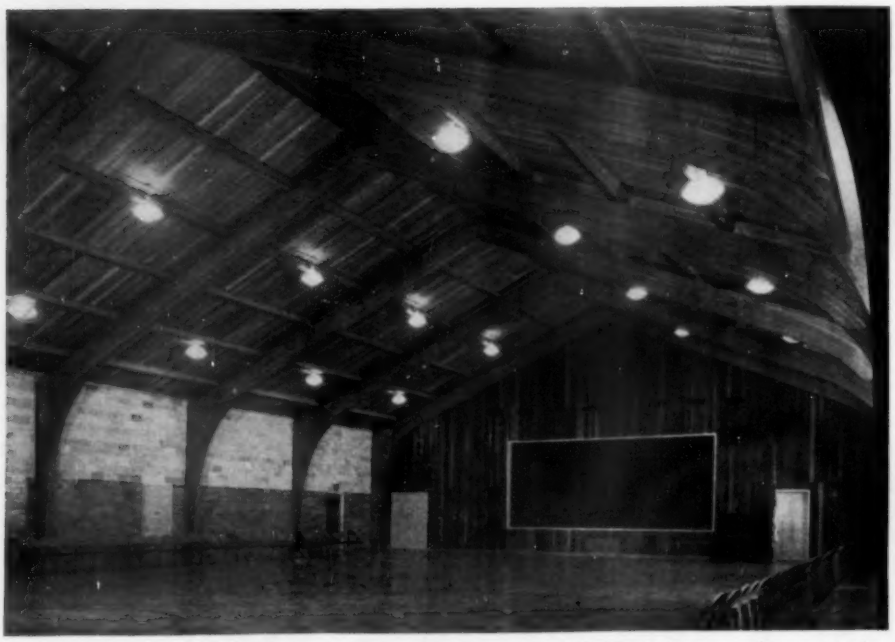


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Because Rilco glued-laminated arches are factory cut and finished, they can be erected quickly by the regular contractor crew at the building site. They save time and labor.



This Elementary School gymnasium, Glyndon, Minnesota, illustrates the dramatic beauty of wood and the clean, graceful lines of Rilco arches. They provide 100% usable floor space with no overhead obstructions.

Architects: Ingemann and Bergstedt, St. Paul, Minnesota



Here Rilco beams add the warm richness of wood, yet the cost is low. This pleasant classroom is in the Goodhue County School, Vasa, Minnesota.

Architect: Max and Gerald Buetow, St. Paul, Minnesota

How your new school can look better ...and cost less

For modern schools, gymnasiums and auditoriums, Rilco structural members combine structural strength with the richness and beauty of wood. Rilco laminated structural members are at their best when left exposed, for they provide a highly decorative, warm, friendly appearance. The luxury of wood is actually inexpensive with Rilco construction because erection costs are remarkably low

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Rilco manufactures beams, columns and arches for school buildings; and arches, trusses and other framing members for gymnasiums, auditoriums and similar buildings where clear-span construction is desired. These Rilco structural members are built up from selected, kiln-dried Douglas Fir laminations, bonded together under pressure by modern structural glues. Each structural member is designed for its job by Rilco's own engineering department. Laminated wood structural members, being of relatively large cross section, are slow to burn. They do not quickly lose their strength under high temperatures. A wood structure doesn't collapse, it holds until the cross section is actually reduced to the breaking point by steady flame. It allows *time* . very often time enough to save the structure and contents.

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Rilco members take advantage of the inherent beauty of wood. They are graceful in shape and add to the appearance of a building. Members can be factory finished . . sanded, coated with wood sealer and wrapped for protection in shipping.

How Rilco Structural Members save money

If you are planning a school building project, consider the advantages of Rilco structural members . . . the dramatic beauty of wood, the strength and permanence of glued-laminated construction, and the greatly reduced labor costs. Rilco has a complete engineering staff and field representatives to give technical assistance on each job. And Rilco's expanded production facilities assure prompt delivery. Write for our free catalog or if you prefer, we'll be glad to have our experienced field representative call to discuss your building requirements.

BASIC SHAPES OF RILCO GLUED-LAMINATED STRUCTURAL MEMBERS



Type 74 Rilco Arches

Type D Boomerang Tangent Arches





Rilco Flat or Pitched Beams



Type 62 Rilcord Bowstring Truss



Type 70 Rilcord

ARCHITECTS: SMITH & VOORHEES, DES MOINES, IOWA



CONTRACTOR: HURLEY CONSTRUCTION CO., ST. PAUL, MINN.

"The cost advantage of the laminated wood," says Grant Voorhees, "was the deciding factor in its selection. We found by using glued laminated wood structural members a very appreciable savings in the cost of the schools was effected. Of course, the beauty of the natural materials when left exposed added greatly to the pleasing, informal atmosphere which we consider so essential in today's elementary schools."



For the modern school design that calls for economical construction and beauty, the architect who specifies Rilco achieves an attractive and structurally sound building at lowest cost. Rilco structural members offer the architect freedom of design with simple yet effective construction in a fire-resistant material. Rilco's service engineers will be pleased to consult with you about your requirements. Write for information or see our catalog (2B/Ri) in Sweets.

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RILCO works wonders with wood

RILCO LAMINATED PRODUCTS, INC.

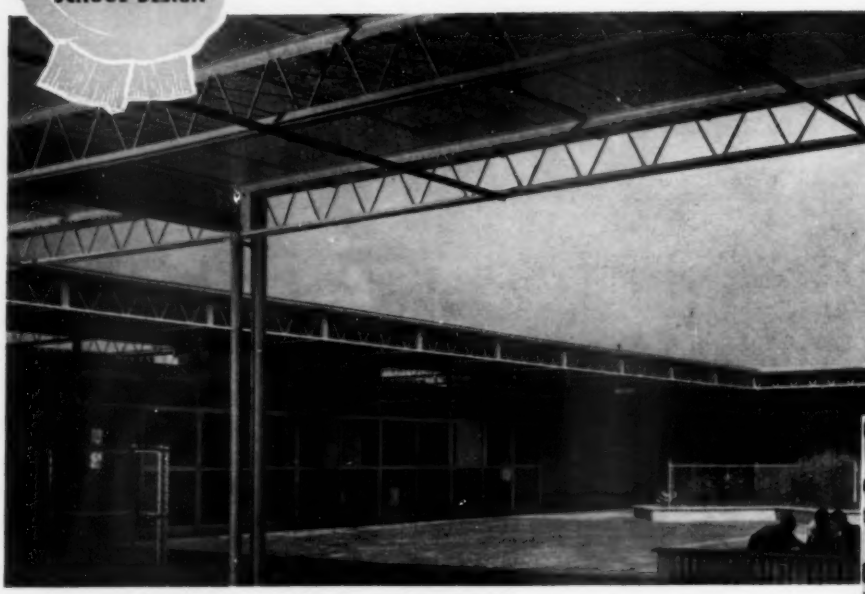
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INSULROCK ACOUSTICAL INSULATING ROOF DECK





West Columbia (Texas) Elementary School, Donald Barthelme, Architect
The photographs above and to the right show how Insulrock roof slabs were used in the prize-winning West Columbia School.

INSULROCK roof slabs provide in a single material, an incombustible roof deck having a high thermal insulation, and sound absorption. It is suitable for many types of school buildings such as gymnasiums, auditoriums, field houses.

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INSULROCK is composed of tough, long, chemically-treated wood fibers which are completely coated with fire-resisting and water-resisting portland cement and bonded together under substantial pressure to form strong, durable, incombustible slabs.

ADVANTAGES

- incombustibility
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Now... a special PC Glass Block for toplighting



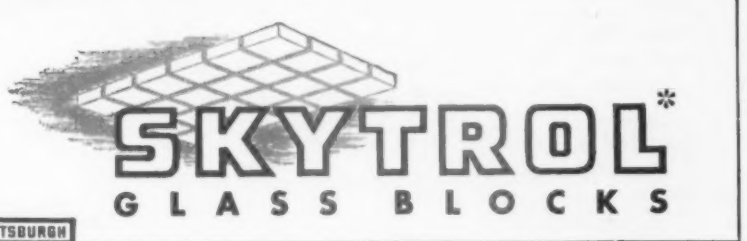
PC FUNCTIONAL GLASS BLOCKS do a fine job of daylighting in standard classrooms. But lately, many schools have been designed with classrooms that are deeper and lower than ever before. This may reduce building costs, but it intensifies the daylighting problem.

PC Skytrol toplighting panels in the *roof* will balance the daylight throughout the room and give adequate daylighting to students even on the inside row. Skytrol panels not only provide good daylight, but they will not "sweat" and drip moisture like conventional skylights.

Your architect can discuss with you how low-cost panels of Skytrol blocks can be designed and built into your new building. Assembled into strong, reinforced concrete panels, these blocks have an insulating value equal to an 8-inch masonry wall. Thus, heat loss is held to a minimum. Skytrol blocks are also ideal for daylighting corridors, cafeterias, gyms, libraries, etc.

For more information on PC Glass Blocks or Skytrol Blocks, write Pittsburgh Corning Corporation, Dept. ANS-45, One Gateway Center, Pittsburgh 22, Pa.

See our advertisement on page A 32 for additional information on PC Glass Blocks.



PITTSBURGH PC CORNING®

ALSO PC GLASS BLOCKS AND FOAMGLAS®

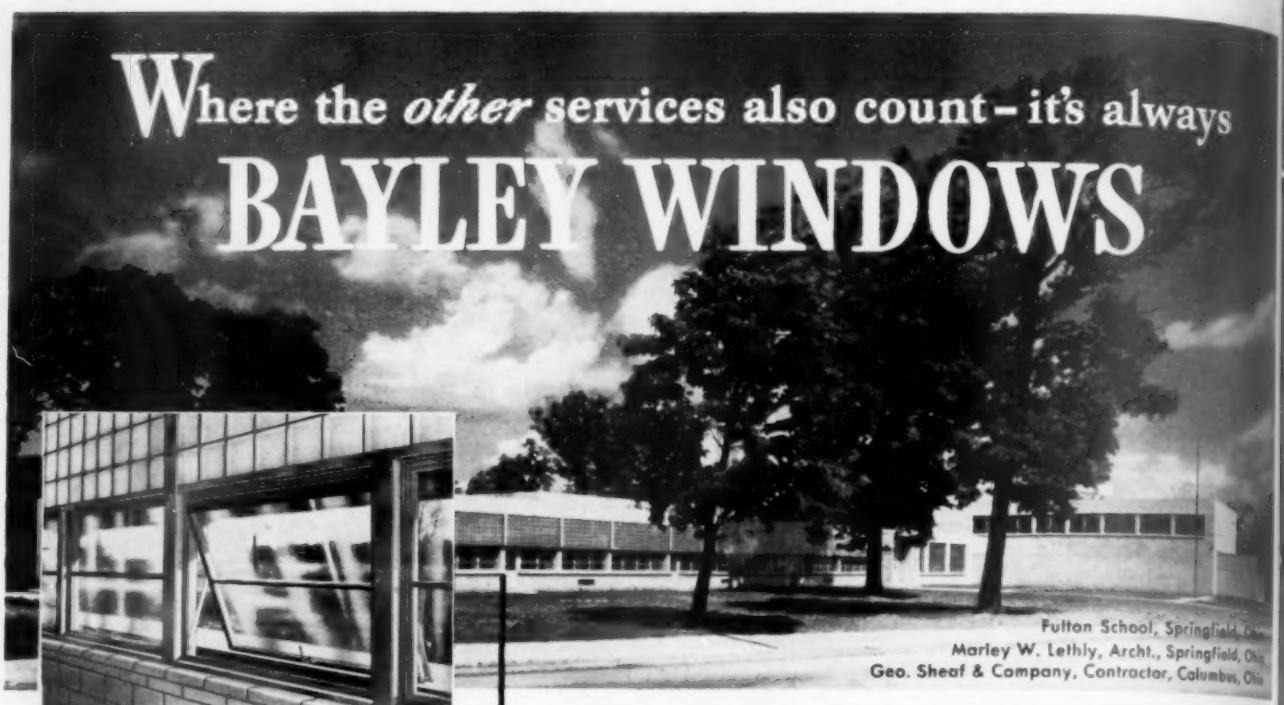
*T. M. Reg. Applied For

THE WILLIAM BAYLEY COMPANY

Springfield 99, Ohio, 1200 Warder St. | New York 17, N. Y., Grand Central Terminal | Chicago 2, Ill., 105 W. Madison St. | Washington 16, D. C., 3701 Mass. Ave., N. W.

Factories: Springfield, Ohio

Where the *other* services also count – it's always BAYLEY WINDOWS



Fulton School, Springfield, Ohio
Marley W. Lethly, Archt., Springfield, Ohio
Geo. Sheaf & Company, Contractor, Columbus, Ohio



Highlights of this New Exclusive BAYLEY Product

—Carries Quality Approved Seal of the Aluminum Window Mfgrs. Ass'n for materials, construction, strength of sections and air infiltration.
—Modern, ribbon-line appearance.
—Maximum air, light and vision.
—Typical Ventilation—



Other layouts available.
—Sub-frames and imposts integral, incorporate separate window units.
—Installed in prepared openings or built into masonry.
—White bronze and stainless steel hardware.
—Permanent, carefree aluminum construction—Requires no paint.

Other Bayley Windows

New Bayley *Vue-LINE* Window

Scientifically Designed for Modern Schools

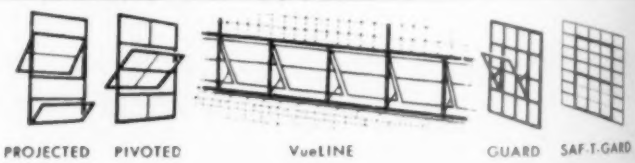
A fine quality product is only the *first* essential to a truly satisfactory relationship. Better cooperation and extended services through all the building stages — going even beyond full performance demands — is even more important. Known for a policy that's founded on this fact is why Bayley is so regularly preferred by discriminating Building Designers.

The new Bayley VueLINE Window is tangible evidence of this policy. To contribute scientific design improvements in a school window, Bayley did not pursue the conventional. They studied the problem from the building's inception to the student's comfort. They collaborated with school Architects and Educational Authorities.

As a result the Bayley VueLINE Window fulfills today's professional diagnosis of a proper window for modern school buildings. In addition it complements the Bayley Aluminum Projected Window, and also it incorporates construction features made possible only by Bayley's years of specialized window experience.

You too will find *extra values* in discussing your window problems — whatever they may be — with Bayley. Write or phone.

See Bayley in Sweet's. Complete catalogs on aluminum windows, 16a/Bay; steel windows, 16b/Ba; Saf-T-Gard Hospital Detention Window, 16b/Bay.

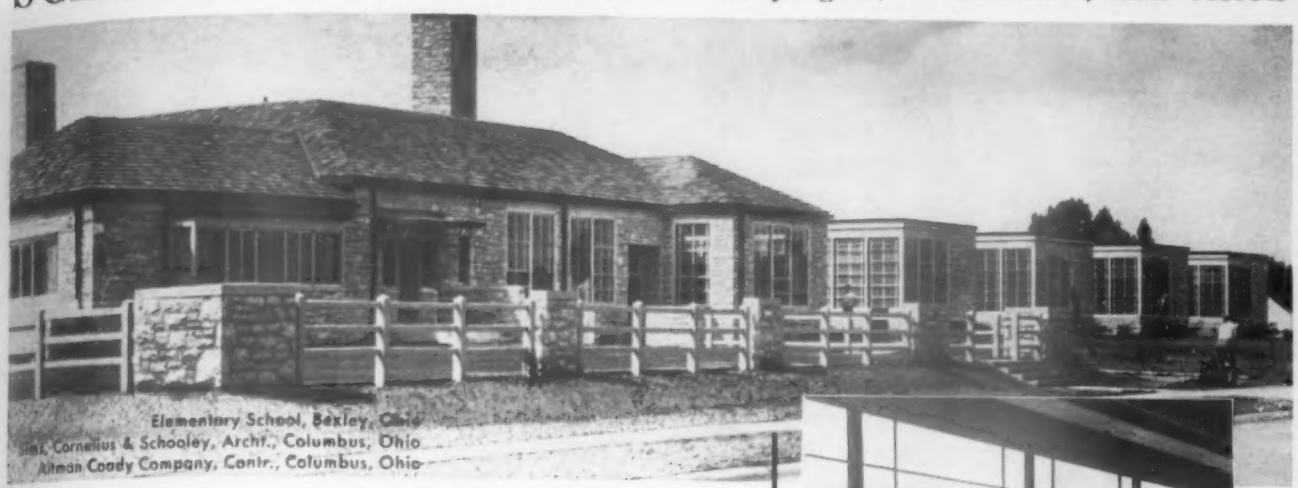


PROJECTED PIVOTED VueLINE GUARD SAF-T-GARD

THE WILLIAM BAYLEY COMPANY

BAYLEY Aluminum Projected Windows

SCHOOL WINDOWS -- that provide ideal control of natural daylight, ventilation, and vision



Elementary School, Bexley, Ohio
Yost, Cornelius & Schooley, Archt., Columbus, Ohio
Altman Coody Company, Contr., Columbus, Ohio



Throughout the nation, Bayley Aluminum Projected Windows have proved time and again to be the right choice for schools of every size and type. They are made of specially extruded, extra-strength aluminum sections. Need no painting. Have no complicated mechanical parts to get out of order. Withstand long years of rugged usage. Simplified design of these windows assures practical utility and pleasing appearance.

ADAPTABLE TO ALL TYPES OF ARCHITECTURE

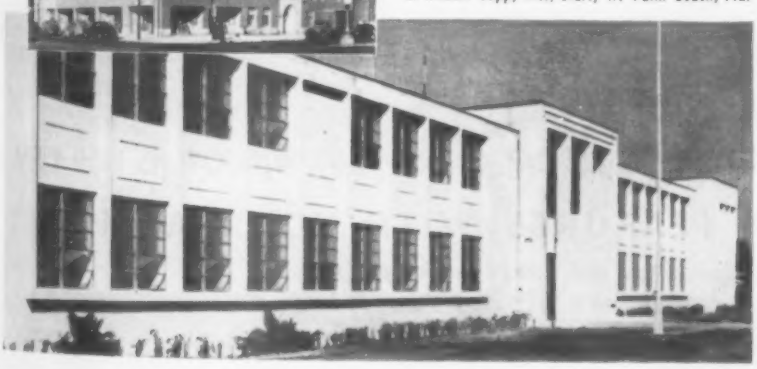
Awning effect of Projected-Out Ventilator combines weather protection and ventilation. Projected-In Ventilator also affords "no-draft" ventilation. Venetian or other blinds can be used at these windows without obstruction. Screens are available. For maximum value, insist on Bayley Aluminum Projected Windows.



BAYLEY
PROJECTED WINDOWS
are also available in STEEL

Left: Moody Bible Institute, Chicago, Ill.
Fugard, Burt, Wilkinson & Orth, Archt., Chicago.
A. L. Jackson Company, Bldrs., Chicago, Ill.

Below: Negro High School, West Palm Beach
Edgar S. Wortman, Archt., Lake Worth, Fla.
G. Hilbert Sapp, Inc., Bldr., W. Palm Beach, Fla.



Highlights of this New Popular BAYLEY Product

- Carries Quality Approved Seal of the Aluminum Window Mfgrs. Ass'n. for materials, construction, strength of sections and air infiltration.
- Modern Appearance.
- Economical — Painting unnecessary.
- Permanent — Long carefree life.
- Simplicity — No complicated mechanism.
- Adaptable to all types of construction.
- Glazing outside — flat surface inside.
- Extra deep sections — Accommodate "Thermopane" or "Twindow" glazing.
- Easily washed from inside.
- Prepared for screens.
- Permits use of accessories, such as draperies, shades, curtains, venetian blinds or awnings.
- Positive acting hardware of white bronze.

QUALITY APPROVED

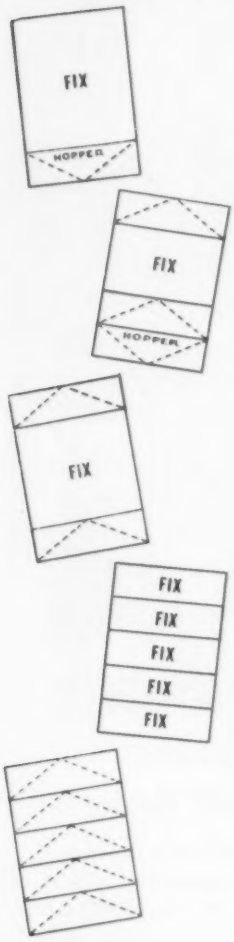
75 *Years of* RELIABILITY

TRU-SEAL WINDOW DIVISION

INDUSTRIAL MACHINE TOOL CO. INC.

Fenton, Michigan

TRU-SEAL ALUMINUM AWNING WINDOWS SOLVE TWO VERY IMPORTANT SCHOOL BUILDING PROBLEMS

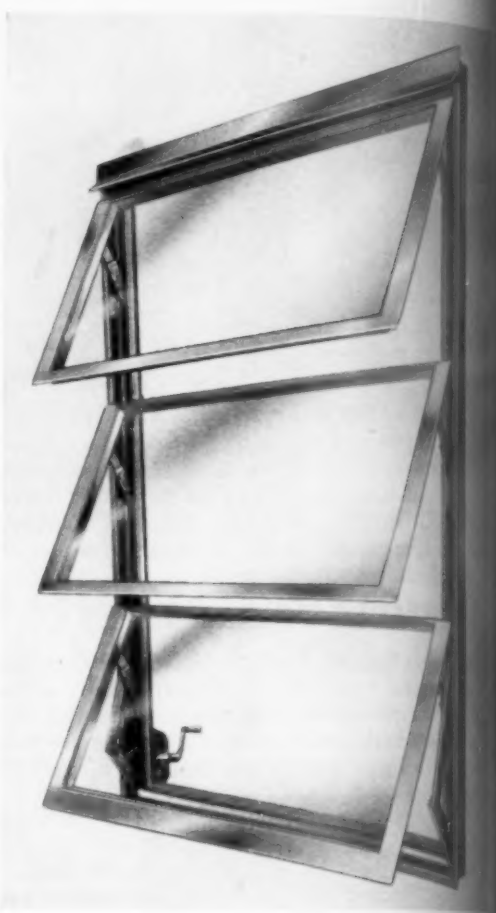


PRIMARY COST

TRU-SEAL aluminum awning windows are available in a wide variety of designs and sizes to fit any style or type of building and are extremely flexible as to figurations. Because TRU-SEAL windows are precision-built, they can be installed at low cost and are competitively priced.

MAINTENANCE COST

TRU-SEAL aluminum awning windows NEVER need paint or putty when aluminum snap-on glazing bead is used. Glass replacement cost due to breakage is very low because of size of pane. All operating vents can be washed on BOTH sides from the inside. TRU-SEAL operating mechanism is absolutely foolproof.



TRU-SEAL

OTHER TRU-SEAL SCHOOLROOM ADVANTAGES

TRU-SEAL

TRU-SEAL awning windows are safer because of their design. The operating mechanism is smooth, effortless and silent. Heavy frame sections have mitered, flash-welded corners and each operating vent has a micromatic adjustment to assure perfect seal. TRU-SEAL windows give you controlled ventilation the year round—a true vinyl weather-seal for winter, and 100% air flow for summer.

PITTSBURGH TESTING LABORATORY INFILTRATION REPORT ON 4' x 5'6" WINDOW IS .059 C.F.M.

DISCUSS THESE TRU-SEAL FEATURES WITH YOUR ARCHITECT

Manufactured under Pat. No. 2383912 (Pending)

Adlake

Aluminum Windows

Adlake

PROVEN QUALITY WINDOW

This window meets or exceeds all quality industry specifications for aluminum windows.

THE
Adams & Westlake
COMPANY
Elkhart, Indiana

● This seal represents the craftsmanship, the integrity, and the experience gained through forty years of manufacturing aluminum windows for the transportation and building industries.

Only Adlake aluminum windows give you

Positive protection against water and air infiltration!

Rugged laboratory tests prove that ADLAKE'S exclusive combination of wool woven-pile weather stripping and patented serrated guides forms a positive seal against wind, rain and cold. And that seal will last!

In one test, 500 gallons of water a minute are played on the glass, and not a drop comes through. In another, wind pressure of 97 m.p.h. on one side of the window does not cause the slightest draft on the other side!



Finger-tip control!

ADLAKE Aluminum Windows may be raised or lowered with ease...and laboratory tests prove this "finger-tip control" will last the life of the window ...for ADLAKE Windows have been raised *one million times*, and operate as smoothly on the last opening as the first!



No painting or maintenance!

ADLAKE Windows never need be painted or maintained other than by routine washing. In many buildings, they have already saved enough in maintenance costs to pay for themselves!



and ADLAKE Windows can be quickly, easily installed...will never warp, stick, rattle or rot...and will keep their good looks and easy operation for the life of the building!

all these plus features!



Saginaw High School, Saginaw, Michigan—Frantz & Spence, Architects—Spence Brothers, General Contractors

Typical **Adlake** window installations

Administration Building, University of Michigan, Ann Arbor, Michigan—Harley, Ellington & Day, Architects—Bryant & Detwiler, General Contractors

Maria High School, Chicago, Illinois—Gaul & Voosen, Architects—The George Sollitt Construction Company, General Contractors



Adlake representatives

Archie W. Adams
Box 186
Butte, Montana

Aichel Steel & Equipment Company
2205 Edison Avenue
Jacksonville, Florida

Atlas Plaster & Supply Company
30th & Greenwood
Louisville, Kentucky

Hugh J. Baker & Company
602 West McCarty Street
Indianapolis 6, Indiana

Hugh J. Baker & Company
1028 South Barr Street
Fort Wayne 7, Indiana

Hugh J. Baker & Company
208 West Iowa Street
Evansville, Indiana

Hugh J. Baker & Company
560 Citizens Building
Decatur, Illinois

Condit Construction Products, Inc.
2800 East Third Street
Dayton 3, Ohio

Crawford Sales Company
Nashville Trust Building
Nashville, Tennessee

Currin Company, Inc.
1208 Carter Street
Chattanooga 1, Tennessee

Harry I. Davis
718 South Carlisle Avenue
Albuquerque, New Mexico

Delph Hardware & Specialties Co.
2109 Hutchison Avenue
Charlotte 1, North Carolina

Durbrow-Otte Associates, Inc.
1426 Clay Street
Cincinnati, Ohio

Samuel A. Ellsberry
3136 Routh Street
Dallas, Texas

A. L. Horwitz
207 Boxley Building
Roanoke, Virginia

S. W. B. Howard Company
921 Walnut Street
Kansas City, Missouri

Janeway Associates, Inc.
2203 Architects Building
Philadelphia 3, Pennsylvania

J. Linc Kern Company
759 N. Milwaukee Street
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R. W. Kerr Building Specialties
220 S. Burlington Avenue
Hastings, Nebraska

Lange-Schmidt Company
6417 Manchester Avenue
St. Louis 8, Missouri

Laughlin and Lawson, Inc.
152 Millsaps Avenue
Jackson, Mississippi

Oklahoma Acoustical and Specialty Co.
36 Northeast 30th Street
Oklahoma City, Oklahoma

Plains Builders Supply Company
1008—6th Street
Lubbock, Texas

Port Distributing Company
1221 Clara St.
New Orleans, Louisiana

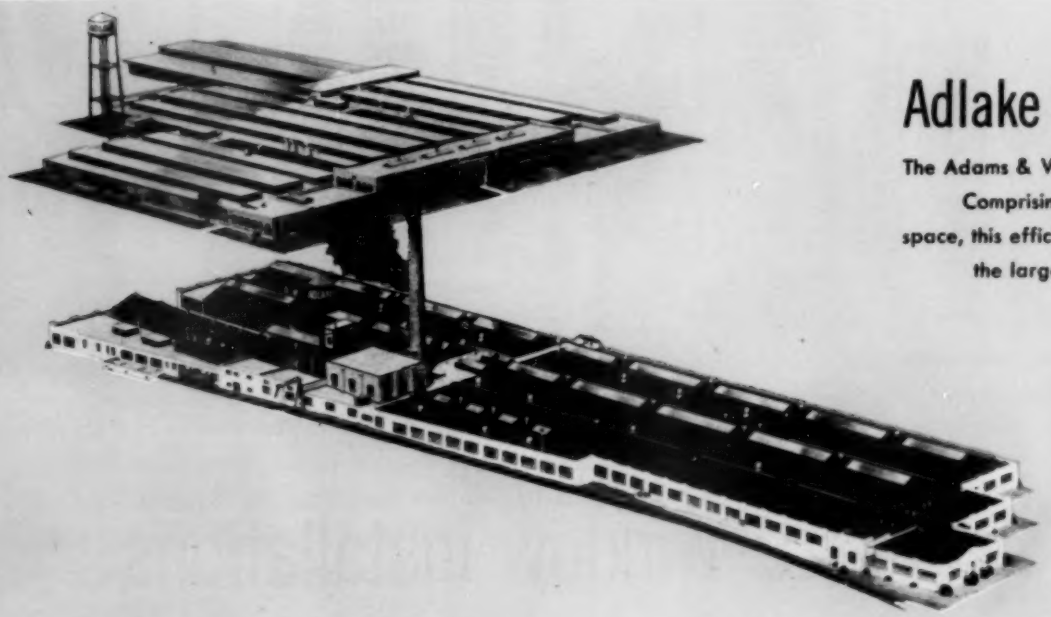
Hugo A. Puls
P. O. Box 2021
Birmingham 5, Alabama

Reliance Equipment Company
9 and 11 North Water Street
Mobile, Alabama

Rolph, Mills and Company
171 Second Street
San Francisco 5, California

Thomas Sackett
320 South Avenue
Rochester 4, New York

J. D. Slaughter Company
2301 N. Charles Street
Baltimore 18, Maryland



Adlake plants no. 1&2

The Adams & Westlake plant at Elkhart, Indiana. Comprising over ten acres of floor space, this efficient modern factory is the largest of its kind in the nation.

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Blackstone Supply
45 Appleton Avenue
Pawtucket, R. I.

J. Francis Blaine
1011 Washington Street
Wilmington, Delaware

Bronsteel Products Corporation
Main & Goodell Street
Buffalo 3, New York

Campbell Associates, Inc.
101 Park Avenue
New York 17, New York

Condit Construction Products, Inc.
12 North Third Street
Columbus, Ohio

Samuel A. Ellsberry Company
2929 Morton Street
Fort Worth, Texas

Gilman and Green
311 Board of Trade Building
Norfolk, Virginia

Shelton W. Greer
3025 Maxroy Street
Houston 8, Texas

George J. Haase
1118 Madison Avenue
Toledo, Ohio

Halteman Company
Allen and St. Cloud Streets
Allentown, Pennsylvania

Hauenstein and Burmeister, Inc.
2629 30th Avenue South
Minneapolis, Minnesota

John K. Messersmith Company
403 East Franklin St.
Richmond 19, Va.

John K. Messersmith Company
2302 Wisconsin Avenue, N. W.
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Midwest Metals Corporation
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James Hood Miller, Inc.
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Tri State Iron Works
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Adlake TRADE MARK

The Adams & Westlake Company · Elkhart, Indiana

97th year of serving the transportation and building industry

SALES OFFICES

Chicago, Illinois
319 W. Ontario Street

New York, N. Y.
101 Park Ave.

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224 Penobscot Bldg.

Windows

that SAVE MONEY year after year!

REPORT	
PERMANENT BEAUTY	A
LOW-COST MAINTENANCE	A
EASY OPERATION	A
LONG LIFE	A



QUALITY APPROVED

(TYPE)

A.W.M.A. Quality Specifications—Materials, Construction, Strength of sections and Air infiltration requirements—confirmed by Pittsburgh Testing Laboratory.

MEMBER—ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

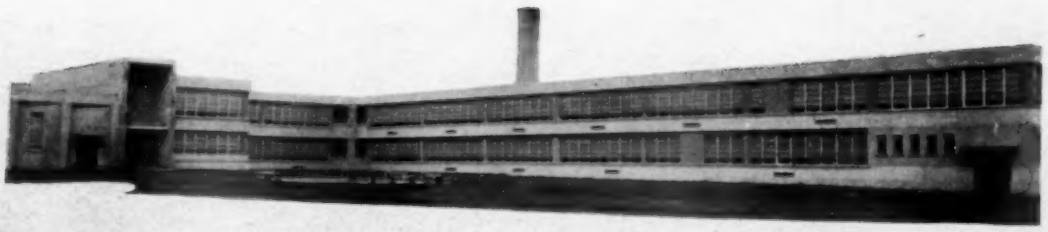
Quality Approved

ALUMINUM WINDOWS



Architects, school officials and

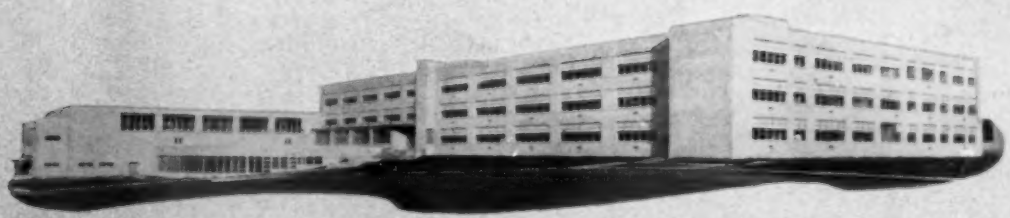
ALUMINUM



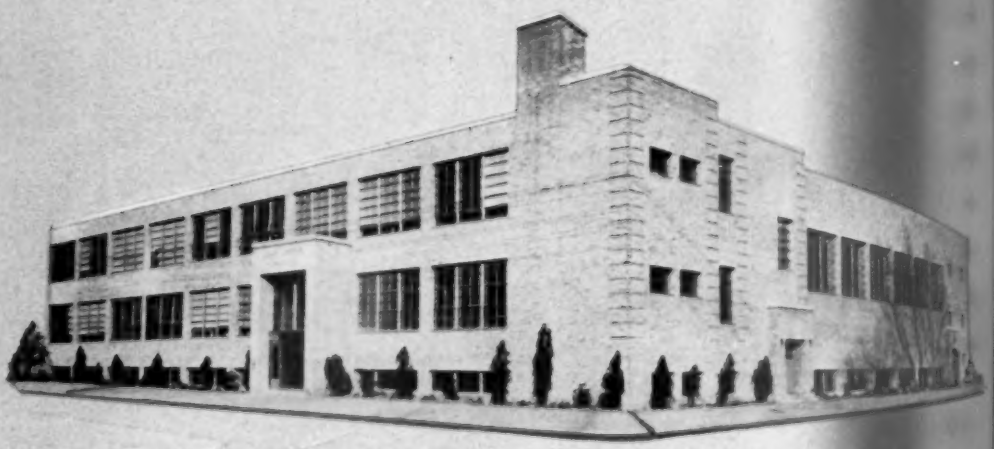
• South Mountain Junior H.S., Allentown, Pa.
Architects: Heyl, Bond & Miller
Contractor: L. W. Hunsicker Co.

• Colwyck School, Wilmington, Del.
Architect: E. William Martin
Contractor: Rupert Construction Co.





• Troy High School, Troy, N. Y.
Architect: Frank J. Morgan
Contractor: Christenson & Nielsen



• St. Joseph's Parochial School, Camden, N. J.
Architect: Thomas J. Earley

SURFACE PROTECTION IS NOT ENOUGH!

Only aluminum is rustproof through and through

Only when you insist on aluminum windows can you be sure of windows that *never, never* rust... windows that *never* need painting. Regardless of claims, mere surface protection against rust is not enough. Wear, unintentional scratches in delivery or installation may nullify any protective surface coating and soon require painting. For your protection insist on aluminum—it's rustproof through and through.

TAXPAYERS give HIGHEST rating to

WINDOWS

for lowest maintenance costs!

Architect or Member of the School Board—you can keep annual maintenance expenses on your new school buildings at an absolute minimum, if you insist on "Quality-Approved" aluminum windows.

Aluminum windows are a really worthwhile investment from any way you look at them. They remain beautiful for the life of the building. They always operate easily, keep out cold drafts, eliminate rattling, give more light and better visibility. They cannot rust or rot . . . *NEVER* need painting or costly repairs . . . save important maintenance dollars year after year. And that's why more and more school boards are insisting on "Quality-Approved" aluminum windows for every new building.

"Quality-Approved" aluminum windows are available through many manufacturers in sizes and styles (double-hung, casement, projected and awning) to fit any design treatment. Only those that carry the "Quality-Approved" Seal have been tested by the Pittsburgh Testing Laboratory and approved for quality of materials, construction, strength of sections and minimum air infiltration. That's why it is so important to look for the red Quality Seal when you order or specify.

Names of approved manufacturers are listed on next page. See our Window Specifications Book in Sweet's (16a/ALU) or write for free copy to Dept. ASU-4.

DOUBLE-HUNG



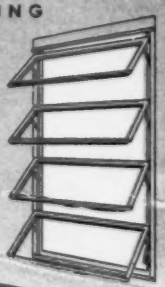
PROJECTED



CASEMENT



AWNING



Aluminum Window Manufacturers Association

74 Trinity Place, New York 6, N. Y.

TESTED



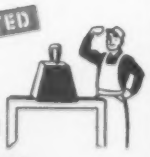
For Quality Materials

TESTED



For Sound Construction

TESTED



For Strength of Sections

TESTED



For Low Air Infiltration



INSIST ON THIS SEAL FOR YOUR PROTECTION



This Quality Seal is for your protection
Look for it when buying aluminum windows

These **window manufacturers are ready to supply you with "QUALITY APPROVED" aluminum windows**



DOUBLE-HUNG WINDOWS

Ceco Steel Products Corp. (Sterling Aluminum Window Div.)	5601 West 26th St., Chicago 50, Ill.
Cupples Products Corp.	2650 So. Hanley Road, Maplewood, St. Louis 17, Mo.
Michael Flynn Mfg. Co.	700 East Godfrey Ave., Philadelphia 24, Pa.
General Bronze Corp.	Stewart Avenue, Garden City, N. Y.
Hunter Manufacturing Corp.	Box 27, Bristol, Pa.
Metal Arts Co., Inc.	Harwell & Oakcliff Rd., Atlanta, Ga.
Reynolds Metals Co. (Parts Division)	2000 So. 9th St., Louisville, Ky.
J. S. Thorn Co.	Allegheny Ave., Philadelphia 32, Pa.
Windalume Corporation	Route 6, Kenvil, N. J.



CASEMENT WINDOWS

Alcasco Products Co.	1780 Creston cor. Laketon, Muskegan, Mich.
Aluminum Home Products Co.	Carr St. & Southern Ry., Knoxville, Tenn.
Ceco Steel Products Corp. (Sterling Aluminum Window Div.)	5601 West 26th St., Chicago 50, Ill.
Fentron Industries, Inc.	2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co.	700 East Godfrey Ave., Philadelphia 24, Pa.
General Bronze Corp.	Stewart Avenue, Garden City, N. Y.
Metal Arts Mfg. Co., Inc.	Harwell & Oakcliff Rd., Atlanta, Ga.
Reynolds Metals Co. (Parts Division)	2000 So. 9th St., Louisville, Ky.
J. S. Thorn Co.	Allegheny Ave., Philadelphia 32, Pa.
Timm Industries, Inc.	5245 W. San Fernando Road, Los Angeles 39, Cal.
Universal Window Co.	950 Parker St., Berkeley 10, Cal.
Ware Laboratories, Inc.	3700 N. W. 25th St., Miami, Fla.



PROJECTED WINDOWS

The Wm. Bayley Co.	1200 Warder St., Springfield 99, Ohio
Ceco Steel Products Corp. (Sterling Aluminum Window Div.)	5601 West 26th St., Chicago 50, Ill.
Cupples Products Corp.	2650 So. Hanley Road, Maplewood, St. Louis 17, Mo.
Fentron Industries, Inc.	2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co.	700 East Godfrey Ave., Philadelphia 24, Pa.
General Bronze Corp.	Stewart Avenue, Garden City, N. Y.
Reynolds Metals Co. (Parts Division)	2000 So. 9th St., Louisville, Ky.
J. S. Thorn Co.	Allegheny Ave., Philadelphia 32, Pa.
Universal Window Co.	950 Parker St., Berkeley 10, Cal.
Ware Laboratories, Inc.	3700 N. W. 25th St., Miami, Fla.



AWNING WINDOWS

The Wm. Bayley Co.	1200 Warder St., Springfield 99, Ohio
Fentron Industries, Inc.	2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co.	700 East Godfrey Ave., Philadelphia 24, Pa.
General Bronze Corp.	Stewart Avenue, Garden City, N. Y.
Miami Window Corp.	5200 N.W. 37th Ave., Miami 42, Fla.
Reynolds Metals Co. (Parts Division)	2000 So. 9th St., Louisville, Ky.
J. S. Thorn Co.	Allegheny Ave., Philadelphia 32, Pa.
Universal Window Co.	950 Parker St., Berkeley 10, Cal.
Ware Laboratories, Inc.	3700 N. W. 25th St., Miami, Fla.

ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

74 Trinity Place, New York 6, N. Y.

Maintenance-saving ALUMINUM WINDOWS

AND ARCHITECTURAL METALWORK for new school buildings



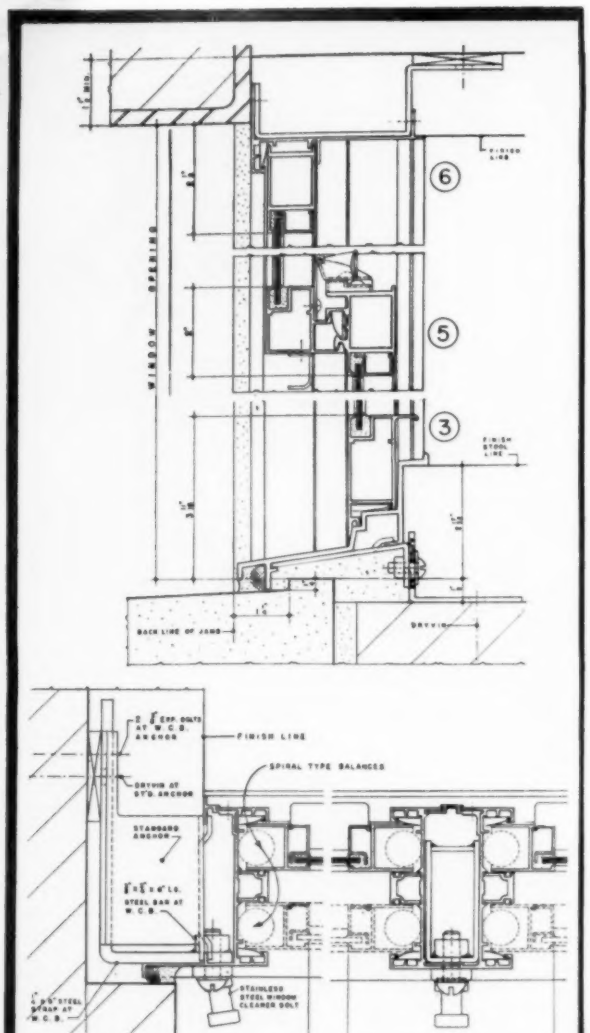
k Elementary School
l, L. I., N. Y.
Van Vleck,
E. Marsh



GB

GENERAL BRONZE CORPORATION

GB PERMATITE DOUBLE-HUNG WINDOWS



ALUMINUM WINDOWS by GENERAL BRONZE

Pioneers in the production of aluminum windows for schools, hospitals and other institutional and monumental buildings, General Bronze Corporation is today recognized as the foremost manufacturer of aluminum windows in the world. Its window installations are to be found in such outstanding buildings as Lever House and the U. N. Secretariat Building in New York City, the Pan American Life Insurance Co. Building, New Orleans, the Gateway Center Buildings, Pittsburgh, Pa. and many others from coast to coast.

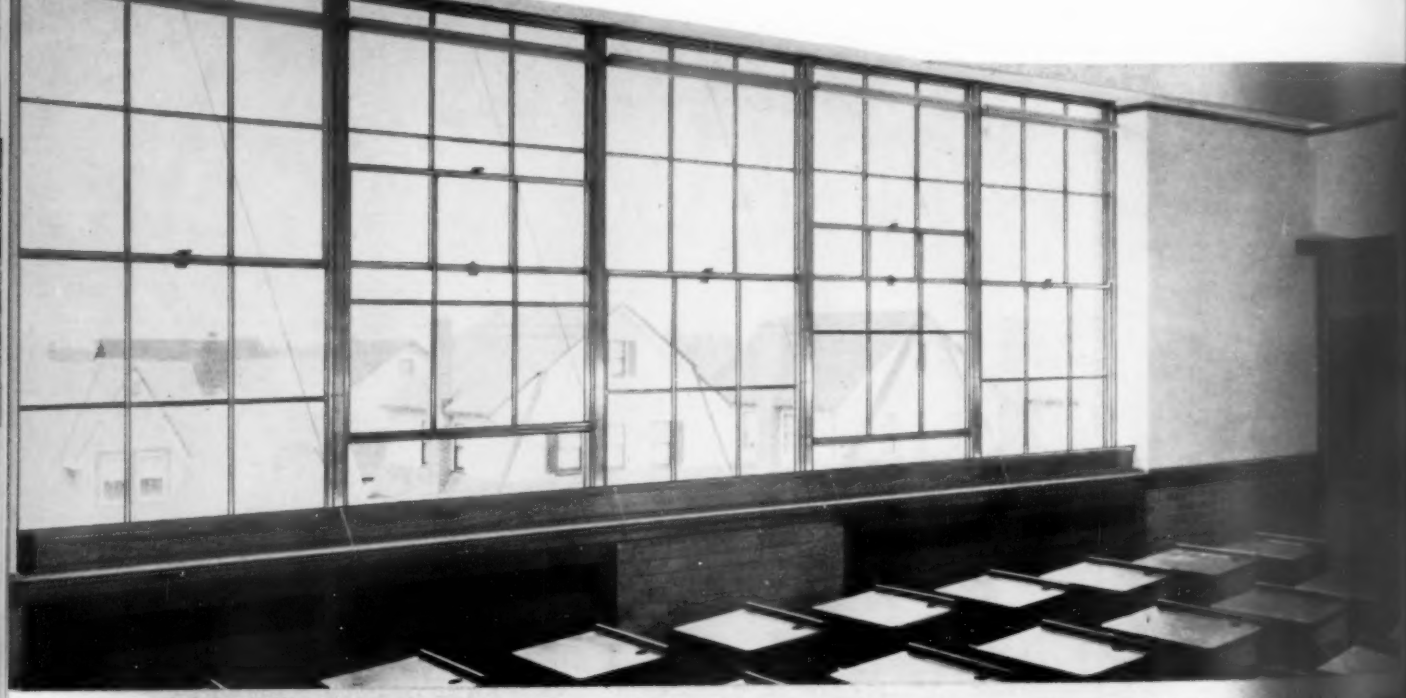
GB PERMATITE aluminum windows are favored by architects and school authorities because they embody many exclusive design features resulting from our more-than-40 years' experience in producing fine quality windows, and because they are precision-made to give countless years of efficient, trouble-free window service. Manufactured from strong extruded sections of aluminum alloy 63S-T5, they have welded frames with heavy sill and jamb sections, plus welded tubular sash sections to assure extra strength and rigidity.

GB PERMATITE aluminum windows reduce maintenance costs to an absolute minimum. They cannot rot or rust. They eliminate forever the costly expense of periodic painting and repairs. They have stainless steel weatherstripping that gives tight, positive closing, keeps out cold drafts and helps save fuel costs.

As you plan new school buildings, be sure you specify GB PERMATITE aluminum windows. Whether the school be large or small—whether it be one story or many stories, you'll find a GB window just suited to your needs. GB PERMATITE windows are available in all styles—double-hung, casement and projected (including mechanically operated projected windows)—and in any size to meet your requirements.

See our complete catalog in Sweet's Architectural File or write for your copy. Address Dept. AS-54. General Bronze Corporation, Stewart Avenue, Garden City, New York.

SEE OUR CATALOG IN SWEET'S



GB Permatite [illegible]
St. Pascals School [illegible]
Architects [illegible]

GENERAL BRONZE CORPORATION

PERMATITE PROJECTED WINDOWS

GET ALL THESE ADVANTAGES

NO PAINTING NEEDED
GB aluminum windows cannot rust or rot. They never need painting, either outside or inside. This annual saving soon exceeds any difference in the initial cost of the window.

SIMPLE, EASY OPERATION
Floating sash construction provides smooth, easy action and prevents binding or rattling.

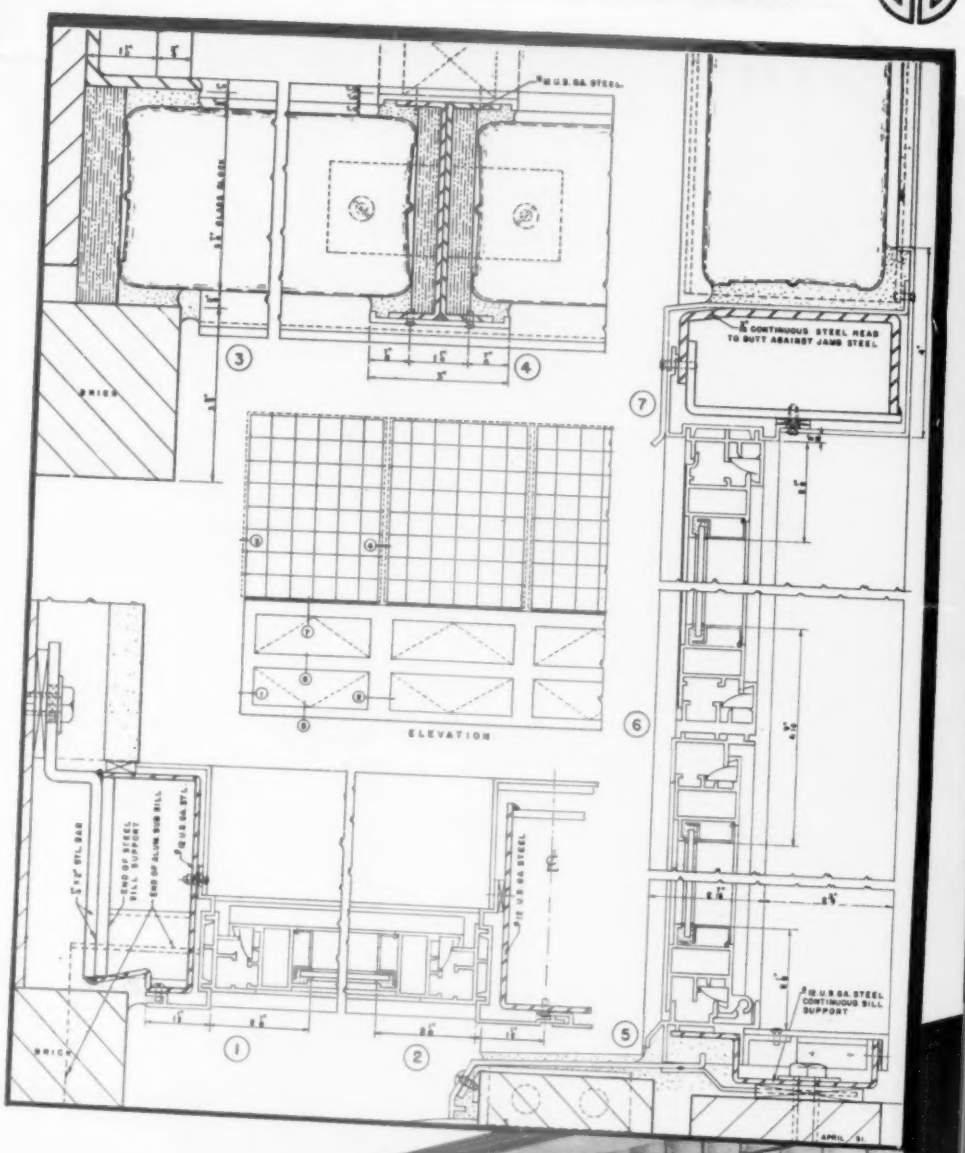
NO MAINTENANCE EXPENSE
The durability, structural and mechanical efficiency of Permatite windows assure continuous trouble-free and maintenance-free operation at all times.

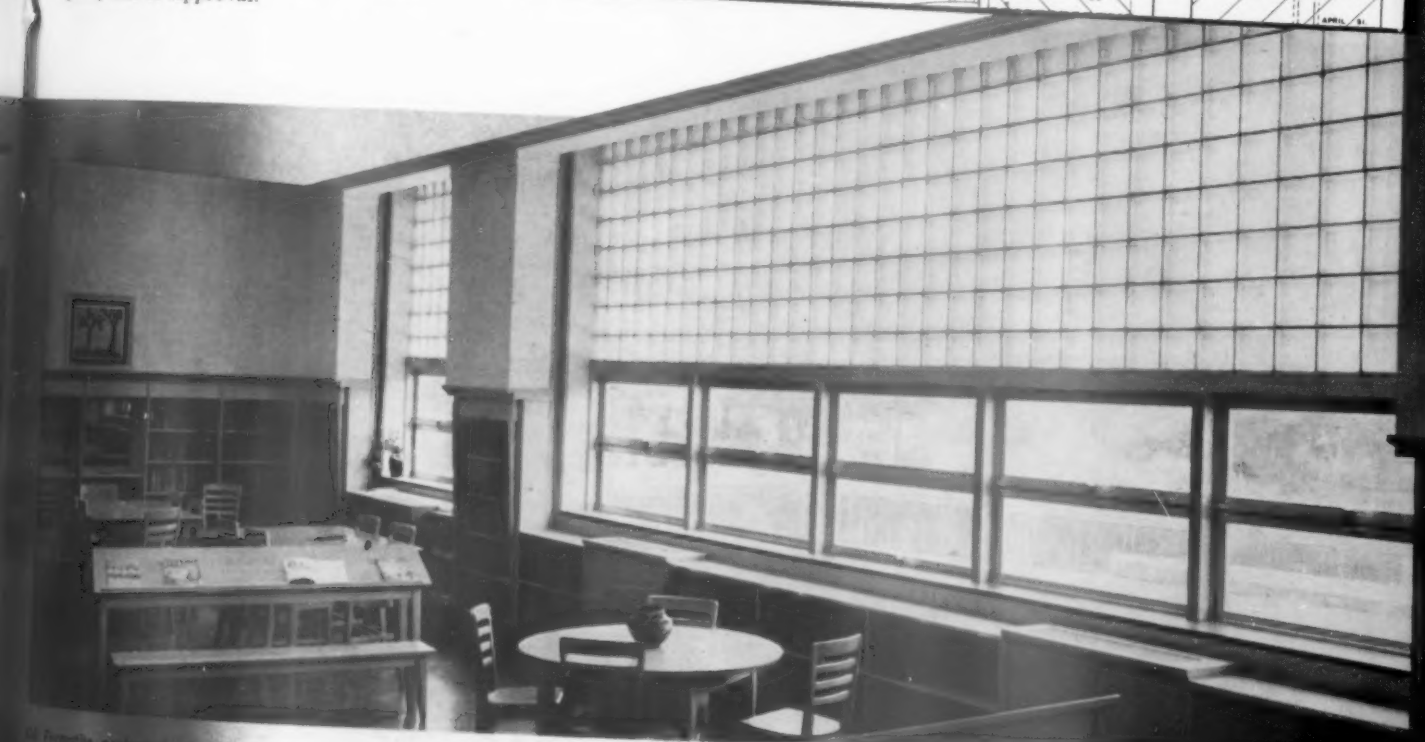
FIT ALL TYPES CONSTRUCTION
Permatite windows can be used with any type of construction material—brick, stone, concrete block, glass block or frame.

FIT ANY BUILDING DESIGN
GB Permatite aluminum windows, with their neutral color, harmonize with any style of architectural design.

MAXIMUM LIGHT
The narrow muntins and sight lines of GB Permatite windows were designed to provide maximum light condtions in any size opening.

TESTED AND APPROVED
All GB Permatite aluminum windows have been tested and approved by the Pittsburgh Testing Laboratories and carry the AWMA Quality-Seal of Approval.





windows
School, Great Neck, L. I., N. Y.
Vleck, Reginald E. Marsh

GENERAL BRONZE CORPORATION

A PARTIAL LIST OF GENERAL BRONZE WINDOW INSTALLATIONS IN SCHOOL AND UNIVERSITY BUILDINGS

Project	*Location*	*Architect*
U. of Kentucky Fine Arts Bldg.	Lexington, Ky.	Brock & Johnson
Euclid Senior High School	Euclid, Ohio	Harry A. Fulton
Florida State College for Women Music Bldg.	Tallahassee, Fla.	Guy C. Fulton
Princeton Univ., Firestone Memorial Library	Princeton, N. J.	R. B. O'Connor & W. Kilham, Jr.
N. J. State Teachers College Women's Dorm.	Trenton, N. J.	Charles Krahmer & Jay C. Van Nuys
Texas Tech. College Dormitory	Lubbock, Texas	Wyatt C. Hedrick
S. E. Missouri State College	Cape Girardeau, Mo.	Wischmeyer & Lorenz
U. of California, Eng. Bldg.	Los Angeles, Calif.	Allison & Rible
Elementary School	Fond-du-Lac, Wisc.	Frank J. Stepnoski & Son
Elementary School	Norfolk, Va.	Vernon A. Moore
Wisconsin State College Library Bldg.	Milwaukee, Wisc.	Brimeyer, Grellinger & Rose
High School	Troy, N. Y.	Frank J. Morgan
Ohio State Univ., Agric. Lab.	Columbus, Ohio	Howard Dwight Smith
Northwest Senior H. S.	Milwaukee, Wisc.	F. A. Wegner
15 Public Schools	New York City	Board of Education
Massapequa High School	Massapequa, N. Y.	Knappe & Johnson
St. Johns University Liberal Arts Bldg.	Hillcrest, N. Y.	Henry V. Murphy
Cornell Univ., Adm. Bldg.	Ithaca, N. Y.	Frederick L. Ackerman



"QUALITY-APPROVED"— All General Bronze PERMATITE aluminum windows, including Double-Hung, Casement and Projected types, have been tested and approved by the Pittsburgh Testing Laboratory and conform to the specifications of the Aluminum Window Manufacturers Association.



Hand rail and architectural metal work by General Bronze Corp.
Saddle Rock Elementary School, Great Neck, L. I., N. Y.

ARCHITECTURAL METAL WORK
in aluminum, bronze or stainless steel

In the design and construction of entrances, doors, stairways, balustrades, grilles and other non-ferrous metal work, General Bronze offers architects the benefits of its more-than-40 years' experience in producing outstanding architectural metal work.

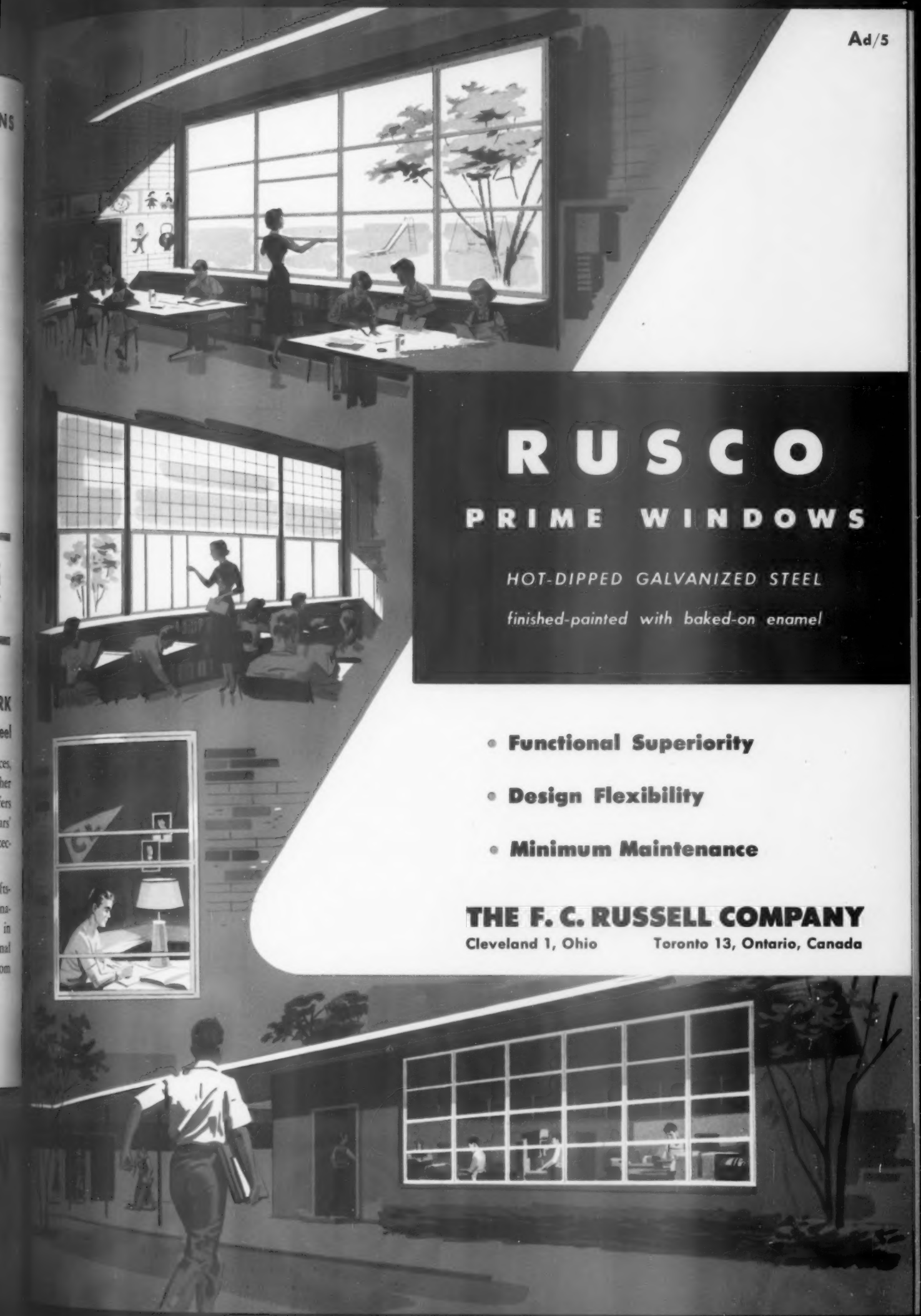
Examples of General Bronze's superior craftsmanship in architectural and ornamental metal work are found in many monumental, institutional and commercial buildings from coast to coast.

GENERAL BRONZE CORPORATION

STEWART AVE., GARDEN CITY, L.I., N.Y.

DISTRICT OFFICES

100 Park Avenue, New York, N. Y. **3849 West Lake St., Chicago, Ill.**



RUSCO

PRIME WINDOWS

HOT-DIPPED GALVANIZED STEEL

finished-painted with baked-on enamel

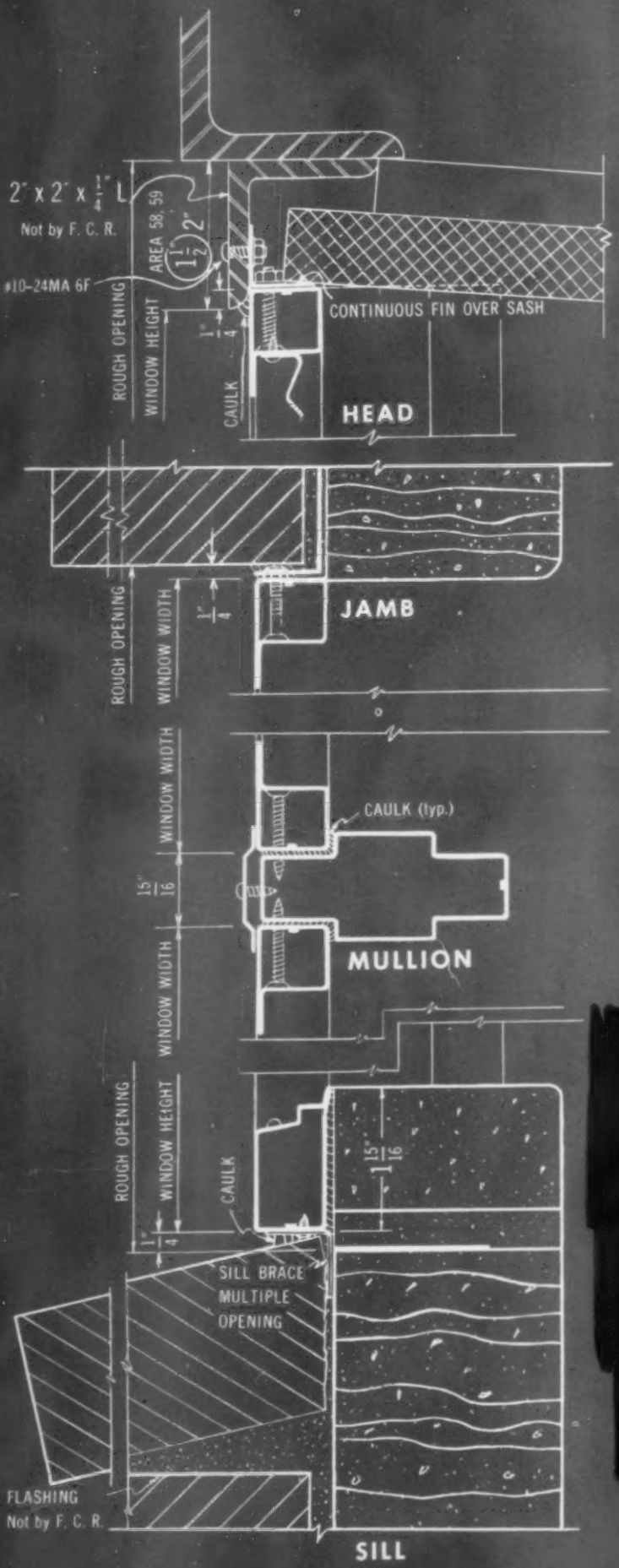
- **Functional Superiority**
- **Design Flexibility**
- **Minimum Maintenance**

THE F. C. RUSSELL COMPANY

Cleveland 1, Ohio Toronto 13, Ontario, Canada

CHECK THESE FEATURES

1. Tubular galvanized steel—rigidity and st… with light weight.
2. Narrow frame and panel members—ma… glass opening.
3. Operable panels removable from inside fo… cleaning.
4. Simple easy operation — no weights, ar… balances.
5. Glazing: no putty—glass bedded with … Plastic Spline insures easy replacement of …
6. Screening (optional): Rusco's Fiberglas … Cloth—will not rust, rot, corrode or stain—… needs painting.



Leading architects and school boa… nizing Rusco Fulvue windows … and most advanced developme… window-wall fenestration. Elimi… objections common to conventio… dows, while providing exclusive … at even less cost.

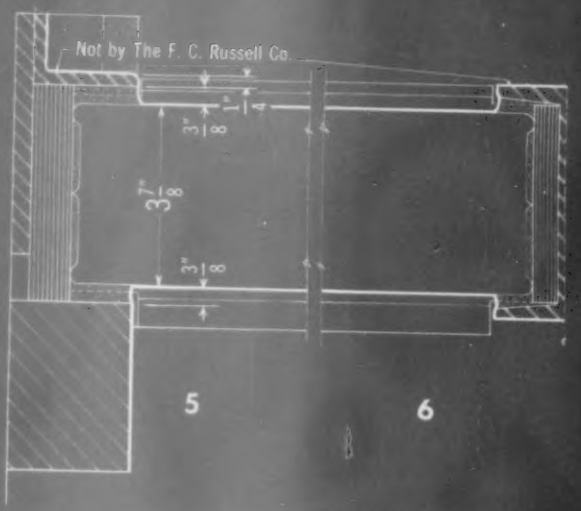
Fulvue meets daylighting, ve… design requirements combining … vision areas with simple easily … weatherstripped ventilators with… of the wall. Eliminates hazardous … suming projected vents. Elimi… darkening shade problems. Unl… possibilities!

Complete factory controlled … operations, finish-painting, glazi…



RUSCO FULVUE WINDOW WALL

7. Finish: Bonderized and finish-painted with grey baked-on outdoor enamel.
8. Window installation may be made with wood casing, metal casing or metal fins.
9. Fully weatherstripped—minimum air infiltration.
10. Low initial cost, simplicity of installation and minimum maintenance make for great economy.
11. Available with insulating sash which provides MagicPanel® no-draft ventilation, reduces heat loss, greatly increases efficiency of air conditioning.
12. During construction—removable panels may be left out of opening until ready to enclose building.



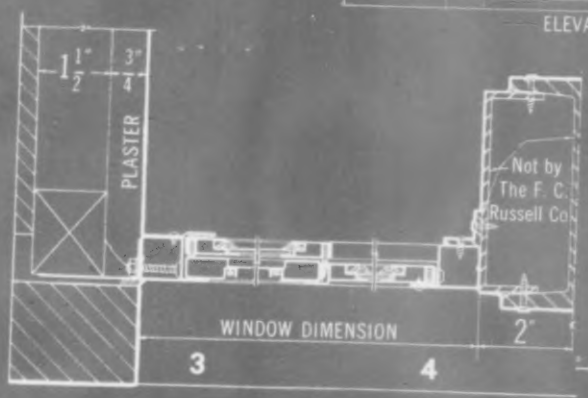


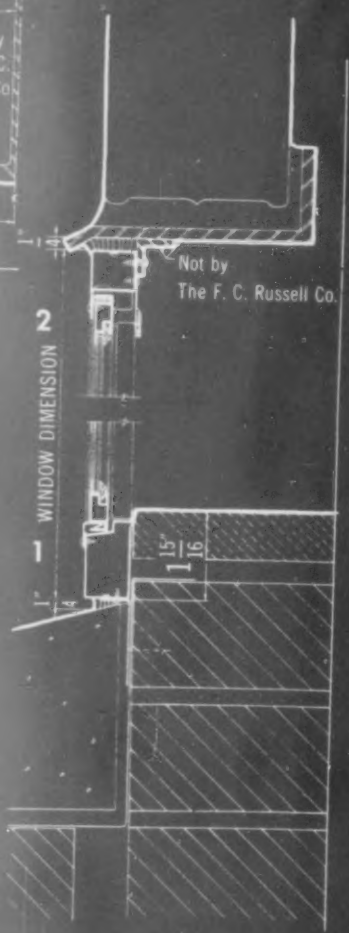
...replace costly field construction ... initial economy, improved function ... appearance, lower operational and main... costs. Check above features.

...manufactured in wide range of widths and ... in two, three and four light high units. ... and insulating sash for double glazing ...

...glass block window walls, Rusco Hori... Slide windows are the ideal vision strip ... Manufactured in a wide range of ... and widths, to suit all requirements. ... these features and advantages of ... and other vertical slide units.

The Rusco Prime Window is truly the ... window for the architect, the school ... and the taxpayer.



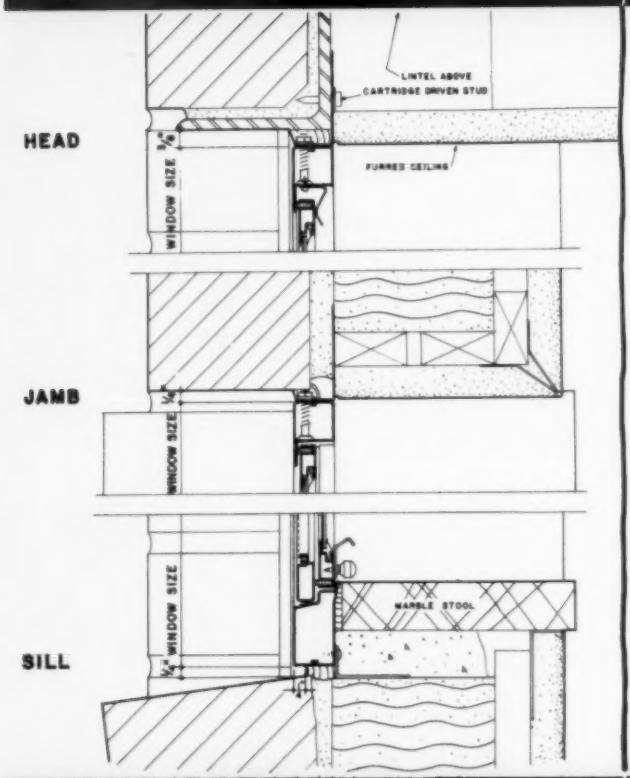




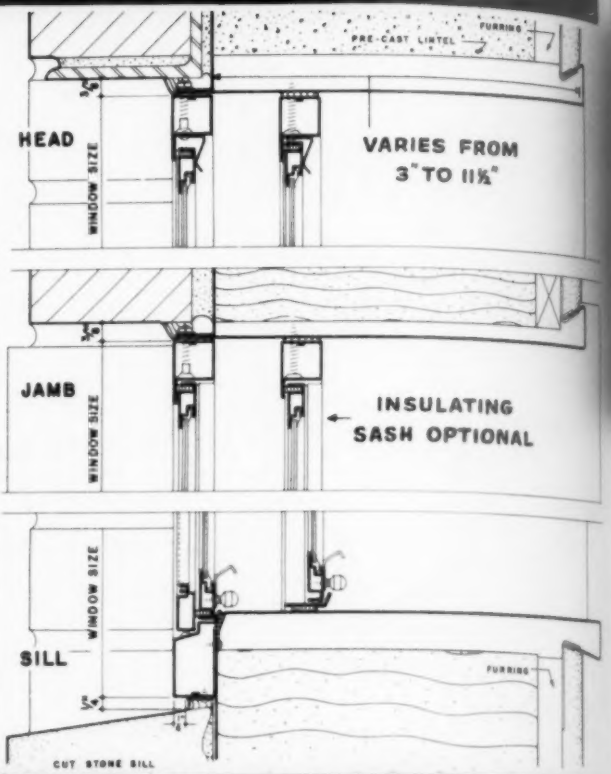
RUSCO HORIZONTAL-SLIDE VISION STRIP

INSTALLATION DETAILS

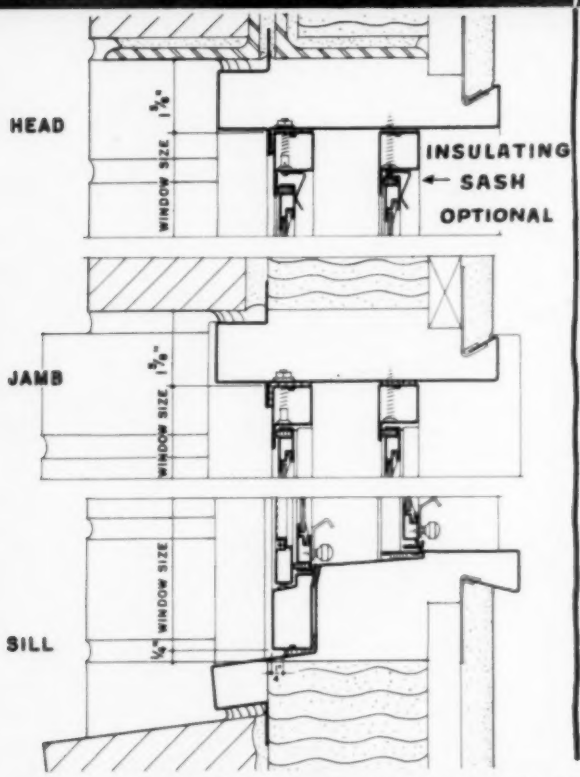
STEEL FIN-MASONRY-8"-PLASTER RETURN



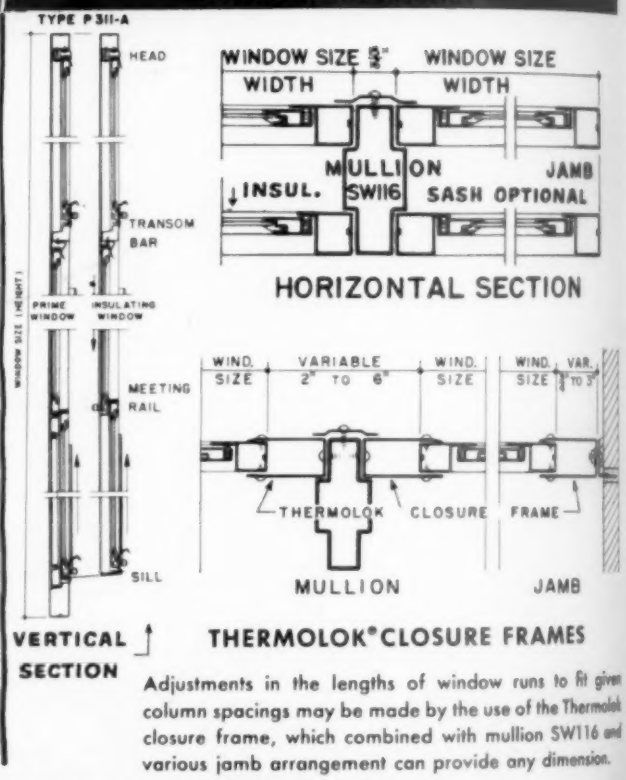
MASONRY-12"-VARIABLE DEPTH CASING



MASONRY-8"-PLASTERED METAL CASING



WINDOW SECTIONS



THERMOLOK® CLOSURE FRAMES

Adjustments in the lengths of window runs to fit given column spacings may be made by the use of the Thermolok closure frame, which combined with mullion SW116 and various jamb arrangement can provide any dimension.

FOR FURTHER INFORMATION CONSULT SWEETS CATALOG OR WRITE:

THE F. C. RUSSELL COMPANY, Dept. 7-AS4

CLEVELAND 1, OHIO

RPW-150 6½M 454 SOL

3 WAYS TO GLAZE SCHOOL WINDOWS

Selecting the best type of glass for glazing school windows is as important as selecting the type of sash. Choice of glass should be guided by careful consideration of several factors—the daylight desired, your local climatic conditions, the hazards of breakage and, of course, the cost. How these factors influence choice of glass for windows is briefly summarized here for the guidance of school building committees and architects.

DAYLIGHT WALLS
for Maximum Daylight and Vision

A Daylight Wall means windows that extend from wall to wall and from the floor or sill to the ceiling. They may be glazed with window glass, sheet glass, plate glass, heat absorbing glass or *Thermopane** insulating glass . . . whichever best suits your needs.

Two great virtues are offered by properly designed Daylight Walls. They permit better illumination of the room with natural daylight than does any other type of wall construction. Second, by affording minimum obstruction to vision, they give a sense of outdoor spaciousness and a feeling of freedom from confinement, both of which are psychologically beneficial.

Since their introduction by forward-thinking architects before World War II, Daylight Walls have come to be used more than any other type of fenestration in the great postwar period of school building. It is significant that all seven prize-winning designs and all ten honorable-mention citations in the 1953 Competition for Better School Design, sponsored by *The School Executive*, employed Daylight Walls.

As with any other structural element of a building, proper design for the site and locality is essential with a Daylight Wall. Such things as the amounts of direct

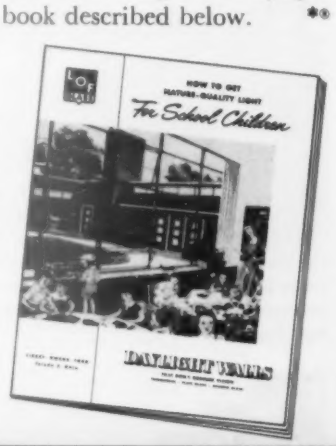


Abundant natural daylight and a clear view to the hills make this a pleasant room for children in Pacheco School, Ignacio, Calif. Architect, John Lyon Reid, San Francisco.

sunlight, light from the sky and light reflected from the ground or other surfaces must be considered. Daylight controls such as blinds, drapes or roof overhangs are desirable because the quantity and quality of light is subject to change during the day and through the seasons. Also, for good distribution of light after it enters the room, interior surfaces must have brightness ratios that assure good vision, free from glare.

Fuller details on the merits and design of Daylight Walls are contained in the book described below. **

DO YOU HAVE A COPY? Written especially for school building committees and architects, this 24-page, fully illustrated book is packed with basic facts about daylighting schools. Ask for *How to Get Nature-Quality Light for School Children*. Free. Dept. AS-174, Libbey-Owens-Ford Glass Co., 608 Madison Ave., Toledo 3, Ohio.



LIBBEY•OWENS•FORD GLASS COMPANY • TOLEDO 3, OHIO

Thermopane

INSULATING GLASS



Cutaway view of *Thermopane*

for Comfort and Fuel Economy

In areas of the country where heat is required for four or more months of the school year, more and more new school buildings are being double glazed with *Thermopane*. Its extra cost is returned in two ways: In extra square feet of usable floor space near windows and in direct dollar savings in fuel costs.

When they are glazed with *Thermopane*, big windows are perfectly practical in cold climates and do not entail oversize heating plants or expensive distribution systems to heat the area near windows. The insulating air space in *Thermopane* keeps the room-side pane warmer than is the case with single glazing. As a result, heat does not radiate from children's bodies to the glass surface at the rate it does with single-pane windows. Pupils and teachers can work in greater comfort near *Thermopane*.

By insulating the window, you enjoy fuel savings year after year that amortize the cost of *Thermopane*. As compared to using single glass, heat loss through windows is reduced 44% by using *Thermopane* having a ¼-inch air space between its two panes. With ½-inch air space, heat loss is reduced 50%.



Rush-Henrietta Central School, Rochester, N. Y., has *Thermopane* Daylight Walls and, because of them, has been heated far more economically than similar-sized schools in the area that have single glazing. Architect: Benedict Ade, Rochester.

Comparative heat transmission table

The over-all heat transmission coefficient U varies with the ranges of temperature at which it is determined. For most practical heat loss calculations, coefficient U is the value determined at ten degrees outside temperature, 70 degrees inside temperature, 15 mph outside air velocity, 0.25 mph average inside air velocity.

Kind of Glass	Glass Thickness	U Value — Air Space None	¼"	½"
Single Glass	⅛"	1.16		
	¼"	1.15		
Thermopane	⅛" or ¼"		.65	.51

Thermopane also reduces sound transmission, a great virtue for schools in noisy localities. It reduces noise transmission over single glass by 44%.

For school glazing, *Thermopane* comprised of two panes of window glass is commonly used. It has the same insulating qualities as *Thermopane* made of higher priced plate glass but, of course, at some sacrifice in clarity of vision. *Thermopane* units in standard sizes are stocked by L·O·F Distributors for ready delivery. Their price is lower because they are made in volume due to their popularity. Many brands and types of metal and wood sash accommodate standard sizes of *Thermopane*.

L·O·F GLASS · L·O·F Fiberglas · L·O·F FIBER-GLASS

LIBBEY·OWENS·FORD GLASS COMPANY · TOLEDO 3, OHIO

*Tuf-flex** TEMPERED PLATE GLASS for Resistance to Breakage



Vandalism and carelessness have made glass replacement a costly item for many schools. Many, too, have experienced accidental breakage in gymnasiums and in windows adjacent to playgrounds. A practical answer to this problem is glazing with *Tuf-flex* tempered plate glass.

Tuf-flex is three to five times more resistant to impact shock from blunt objects than ordinary plate glass of the same thickness. The test illustrated at the left shows how effectively *Tuf-flex* glass resists impact. A 2-pound steel ball breaks ordinary plate glass ¼" thick when dropped from a height of 8 inches, on the average. With *Tuf-flex* ¼" thick, the average critical height goes up to 44 inches.

Translate that comparison into impact from baseballs, footballs or stones—and you can see why *Tuf-flex* glass can save money for you. It often is cheaper to use *Tuf-flex* for all glazing in a gym or alongside a playground than it is to use other materials or regular glass completely covered with guards. With *Tuf-flex*, guards are used only as extra protection where direct body contact may occur.

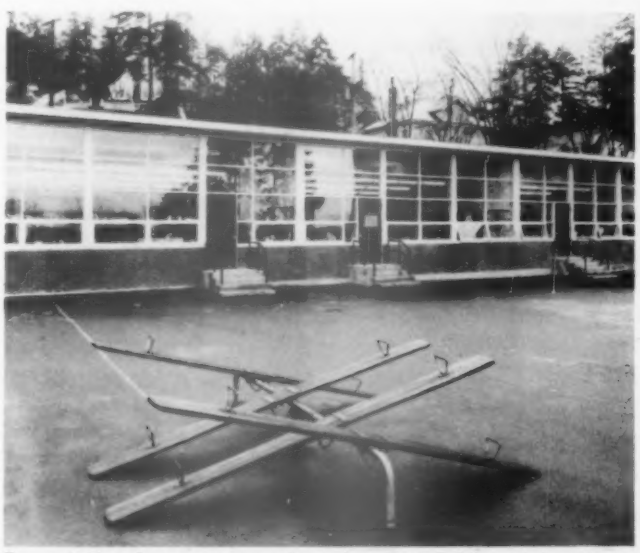
Tuf-flex contributes to the practicability of all-purpose rooms. In a combination gym and auditorium, for example, you don't want windows completely covered with steel bars, yet you want protection from breakage. With *Tuf-flex*, you can have the beauty of clear plate glass areas, plus protection.

While *Tuf-flex* glass, like any glass, is not unbreakable, the heat-tempering process at the factory makes it stronger. When the limit of resistance is reached, *Tuf-flex* disintegrates into small particles resembling bath salts, which reduces the possibility of injury.



Proof of resistance to impact . . . *Tuf-flex* is used for basketball backboards in many gymnasiums.

MANY USES. In addition to windows, *Tuf-flex* is used for basketball backboards, for kick plates and push plates on doors, for balustrades and railings, and for enclosure of exhibits, particularly those containing valuable or fragile materials. *®



Games in the play area are no hazard to these *Tuf-flex* windows in the Ainsworth School in Portland, Oregon. Architect: Raymond Kermit Thompson, Portland.

LIBBEY•OWENS•FORD GLASS COMPANY • TOLEDO 3, OHIO

In planning window treatment for new schools, remember that *Tuf-flex* glass is an investment that can pay dividends for many years. If you have experienced excessive breakage of glass in some areas of your present school, it may pay you to replace ordinary windowpanes with *Tuf-flex*.

Exact sizes must be specified because *Tuf-flex* cannot be cut or otherwise processed after it is tempered. It can be supplied in circles, squares, rectangular and special shapes cut to pattern. The size limitation for *Tuf-flex* ¼" thick is 72" x 120". For size limitations on plate glass of greater thickness, or of special colors, consult your Libbey·Owens·Ford Glass Distributor or Dealer.



The beauty of clear plate glass is combined with the protection of *Tuf-flex* in this Daylight Wall. Deer Park School, Fairfax, California. Architect: John Lyon Reid, San Francisco.

For further information, call your Libbey·Owens·Ford Glass Distributor or Dealer . . . or call one of the L·O·F District Offices listed below.

Ardmore, Pa. Midway 2-8825-26-27
121 Coulter Ave.

Atlanta 3, Georgia Lamar 5239
1001-1004 Whitehead Bldg.
223 Peachtree Street, N. E.

Boston 16, Massachusetts Hubbard 2-0100
1437 Statler Bldg.
20 Providence Street, Park Square

Buffalo 3, New York Cleve. 0291
1112 Rand Bldg.
14 Lafayette Square

Chicago 3, Illinois Central 6-2490
Room 1400-1410
120 South LaSalle St.

Cincinnati 2, Ohio Main 6174
912 Enquirer Bldg.
617 Vine Street

Cleveland 13, Ohio Main 1-7180
1302 Terminal Bldg.

Dallas 1, Texas Riverside 4026
1402 Tower Petroleum Bldg.

Dayton 2, Ohio Michigan 8315
901 Third National Building

Denver 2, Colorado Tabor 5-8015
414 Tramway Bldg.

Detroit 2, Michigan Trinity 5-0080
610 Fisher Bldg.

Indianapolis 4, Indiana Franklin 1363
724 Circle Tower Bldg.
5 East Market Street

Kansas City 6, Missouri Victor 5360-61
619 Dwight Bldg.
1004 Baltimore Street

Los Angeles 5, California Dunkirk 8-0461
1101 Tishman Bldg.
3440 Wilshire Blvd.

Memphis 3, Tennessee 37-7589
540 Sterick Bldg.
8 North Third Street

Milwaukee 3, Wisconsin Broadway 2-2887
5154 Plankinton Bldg.
161 West Wisconsin Ave.

Minneapolis 2, Minnesota Main 8421
506 WCCO Bldg.

New York 16, New York Murray Hill 2-4511
99 Park Ave.

Richmond, Virginia 3-3034
1122 Mutual Assurance Society Bldg.
909 East Main Street

St. Louis 1, Missouri Central 1-9844
Ambassador Bldg.
411 N. 7th Street

San Francisco 5, California Sutter 1-4366
635 Rialto Bldg.
116 New Montgomery Street

Seattle 1, Washington Seneca 2213
210 Lloyd Bldg.
Sixth and Steward Streets

Toledo 3, Ohio Fairfax 5761
608 Madison Ave.

Washington 6, D. C. Sterling 3-4472
806 Connecticut Ave.
204-5 Andrew Jackson Bldg.

Litho in U.S.A.

L·O·F GLASS Corrulux FIBER-GLASS

LIBBEY·OWENS·FORD GLASS COMPANY · TOLEDO 3, OHIO

A d/7

MARMET

ALUMINUM

WINDOWS
VENTILATORS
DOORS



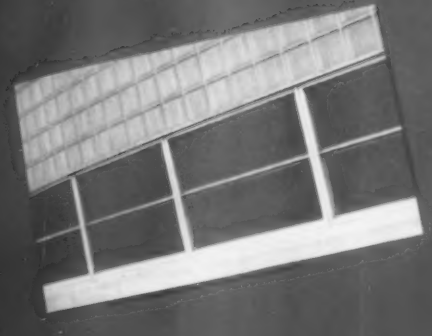
Parkview Jr. High School, Cranston, R. I.
Architects, Creer, Krut, Cruise & Aldrich



St. Rose School, Cleveland, Wis.
Architect, F. W. Sprague



Holy Name School, Sheboygan, Wisconsin
Architect, Edgar R. Stubenrauch



for today's schools . . .

The preferred windows for school installations, Marmet aluminum ribbon windows and windowwalls are economical, provide maximum weather protection and offer life-time, maintenance-free operation.

Marmet casement or projected-type sash are of monumental type -- manufactured of extra-heavy material -- sash and frame sections -- and are designed to meet the most rigid requirements. Installed into prepared masonry openings, Marmet aluminum windows offer quality construction of great strength and durability, with exceptional visibility and light area. Marmet glass block construction aluminum ventilators are available to meet specific requirements and provide ventilation and extra vision in glass block construction.

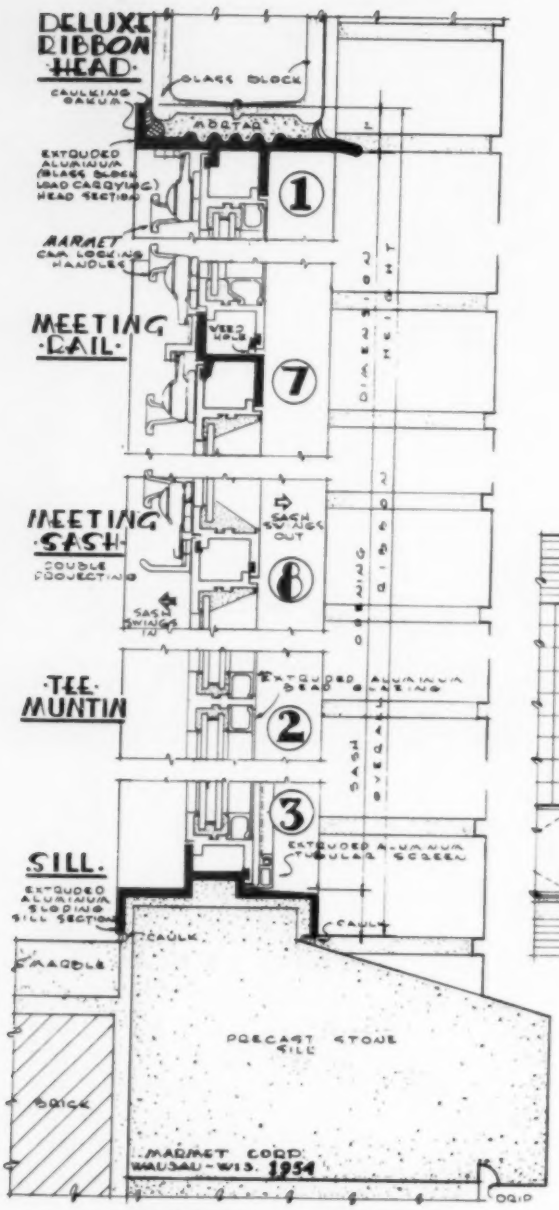
Marmet aluminum doors -- extruded or aluminum covered -- offer doors of high structural strength without bulk and permit maximum light area.

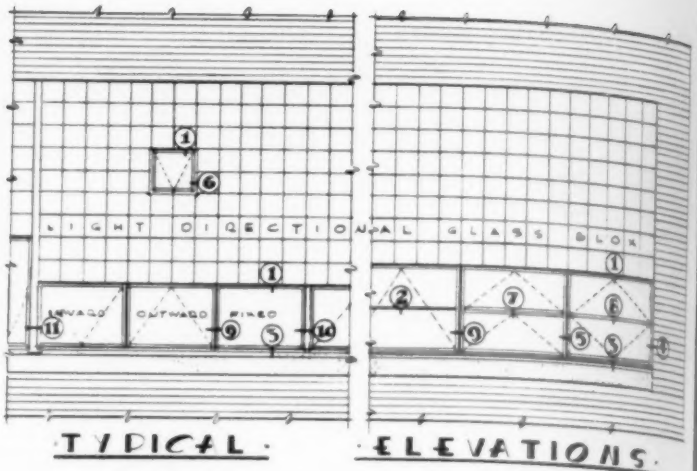
Write for complete specifications and details without obligation.

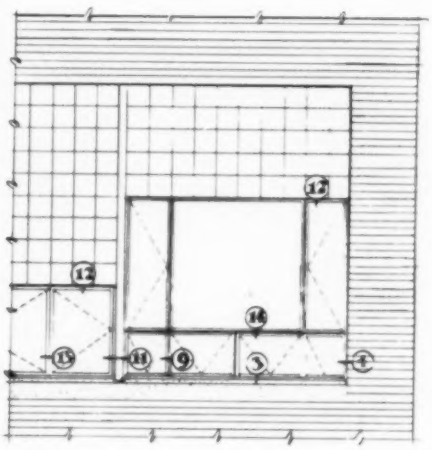
MARMET CORPORATION
WAUSAU, WISCONSIN

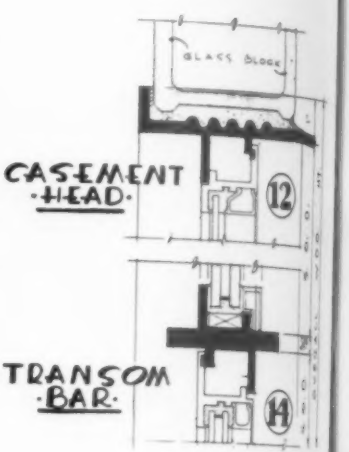
CATALOG 54-3

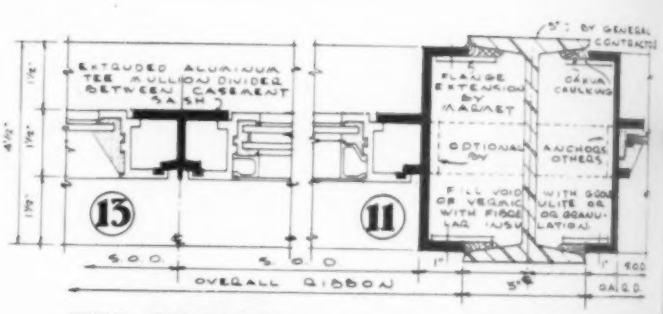
MARMET ALUMINUM WINDOWS

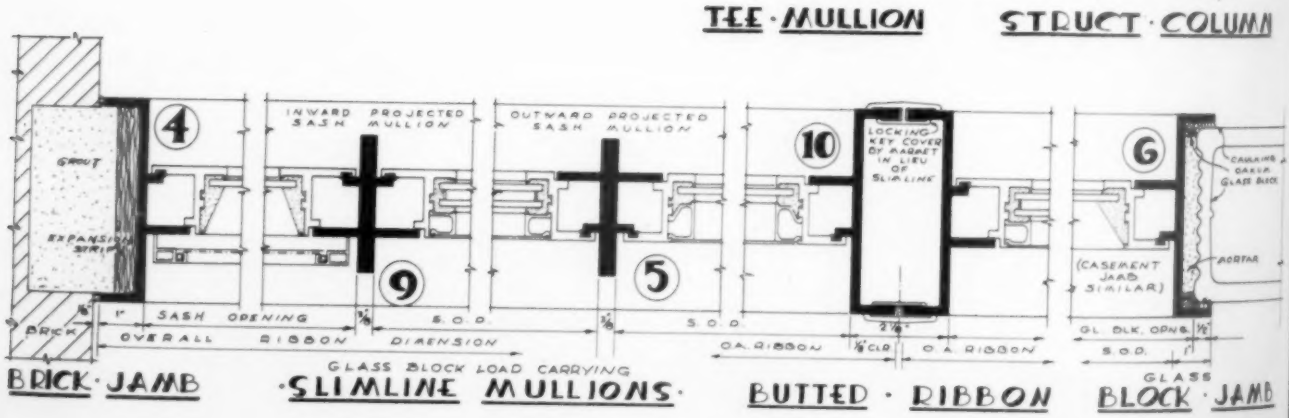












MARMET aluminum

ribbon windows

window walls

deluxe ribbon windows

Marmet DeLuxe ribbon windows, for use with glass block construction, provide a vision strip of the finest quality material, fabricated from extra heavy aluminum sections. These windows feature a heavy, corrugated head, with height of corrugations as much as ⅜ inch. They are designed to resist shock and to increase lateral strength without additional weight. An exclusive feature of these windows is the "slimline" mullion between sash -- ⅜ in. thick, resulting in a neat, trim appearance.

DeLuxe ribbon windows are furnished in four types: inward projected sash, outward projected sash, casement sash and double-acting sash, i.e., half inward or outward and half outward or fixed.

Designed to carry 120 square feet of glass block or a maximum panel of 20 feet wide and 6 feet high, the DeLuxe ribbon windows are available in any length up to 20 feet long and 3 feet high. (Details on request.)

standard ribbon windows

Marmet standard ribbon windows are a lighter weight sash than the DeLuxe type and are ideal for smaller spans of glass block where larger sash openings are not required. They have the same structural features as the DeLuxe type, however, within the recommended limits. (Write for complete specifications and details.) (Specifications and details on Marmet steel ribbon windows on request.)

features

- permanent
- fabricated from quality materials
- no maintenance required
- made to fit given openings
- provide extra strength and shock resistance
- neat and trim in appearance
- weathertight
- easy to operate
- provide extra vision with maximum light area

wall of windows

Marmet wall of windows -- or often called curtain wall -- made of aluminum -- to receive any type of single or insulated glass. These wall of windows are "factory fit", unglazed and ready for installation, are permanent and require minimum maintenance. They have found demand because they are in accord with more daylight in the classroom. No other type of construction will cost less or be more attractive than the use of Marmet 3½" x 5" wall of windows or curtain wall section. Custom built to your requirements and Marmet Satinized for beauty.

finish

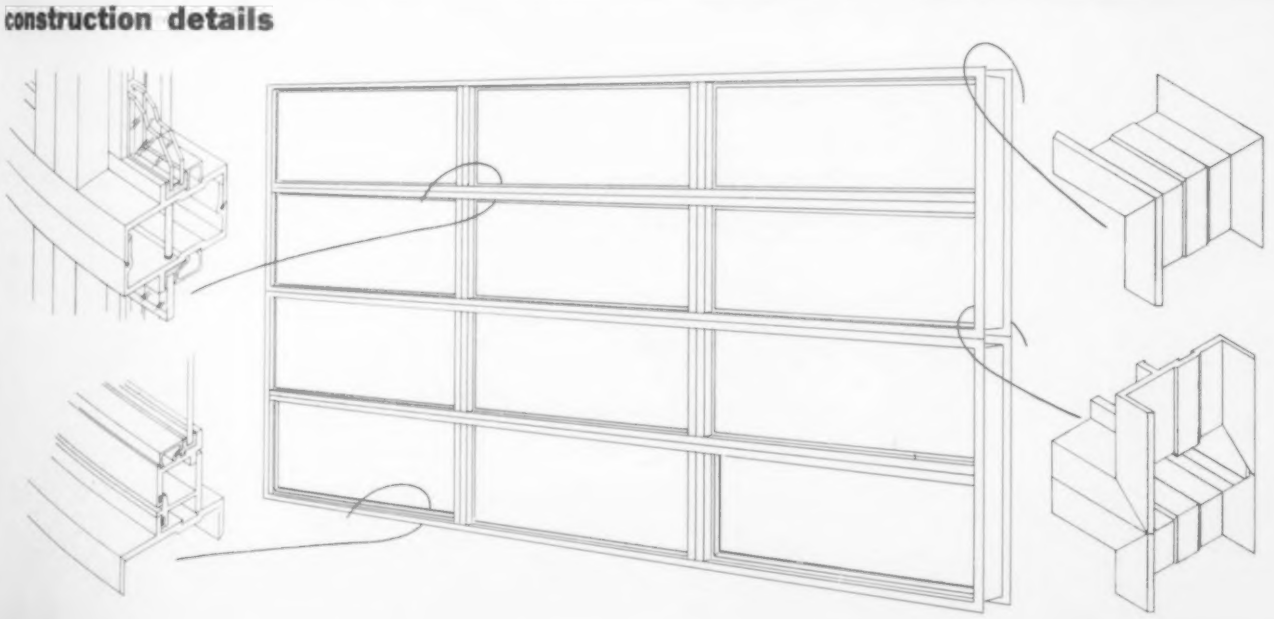
All Marmet Windows shall be finished in Marmet Satinized Finish or alumited natural aluminum, clear of mars and blemishes, with two coats of clear lacquer applied at the factory.

SCREENS -- Screens shall be furnished by the window manufacturer, of tubular aluminum frame and sixteen gauge aluminum cloth mesh. All sash, as specified on the drawings, shall be furnished with inward or outward type screens in the various rooms specified. Outward projected type screens shall be provided with an offset wicket to enclose the cam handle when the sash is closed, and to permit maximum insect protection when the window is open.

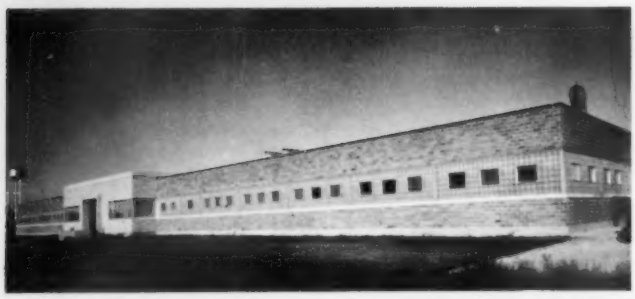


Framingham Elementary School, Framingham, Mass.
Architect, Anderson and Nichols

construction details



glass block ventilators



A practical window which provides ventilation and vision for glass block construction.

Marmet Ventilators with Marmet Satinized Finish enhance the beauty as well as utility of glass block panels and walls.

Sturdy, corrosion resistant, welded construction.

Weathertight -- Fine Hardware.

Removable Sash -- Deep Glass Rabbett.

Marmet Glass Block Ventilator Frames are available in extruded Aluminum, stainless steel and heavy gauge steel. No lintel is required for the installation of Marmet Ventilators because they are sturdily constructed and carry the stress put on by a glass block panel. When installing, it is advisable to brace the opening with a wood prop in the center of the sash while the panel is under construction, removing same after mortar is set.

Because there are many requirements as to types and thicknesses of glass, all Marmet ventilator prices refer to unglazed units.

Marmet Ventilators are available in 30 stock sizes and special sizes will be built in quantity lots to your specifications.

Aluminum screens or storm sash for all sizes are available.

Marmet Ventilators have an integral frame welded at all corners. Individual sash are welded at corners and provided with weather contacts to frame. The inward projected sash are provided with two balancing arms and sliding friction shows with spring brackets.

FINISH --

All Marmet ventilators are Marmet Satinized and are further protected with clear lacquer.

Ventilator sash is provided with one spring-type transom catch.

features

- sturdy
- corrosion resistant
- welded construction
- weathertight
- removable sash
- deep glass rabbett
- fine hardware furnished

specifications

SCOPE OF WORK -- To furnish and install of sizes and types shown on plans and elevations of the drawings, Marmet Ventilators.

MATERIALS -- Ventilators shall be constructed of (Extruded Aluminum Sections, Formed Mild Steel or Stainless Steel) as manufactured by Marmet Corporation, Wausau, Wis.

CONSTRUCTION -- Ventilators shall have an integral fram welded at all corners. Individual sash shall be welded at corners and provided with weather contacts to frame. The inward projected sash shall be provided with two balancing arms and sliding friction shoes with spring brackets. All are Marmet Satinized and are further protected with clear lacquer.

HDWE. -- Ventilator sash shall be provided with one spring-type transom catch.

SCREENS -- See above.

CAULKING -- Mastic caulking shall be applied evenly and to the full depth of joint in and outside perimeter of ventilator.

CLEANING -- Ventilators and Screens to be left clean on completion.

aluminum doors



Marmet doors are available in extruded aluminum or [illegible] dried wood cores covered with anodized aluminum.

extruded aluminum doors

The extruded aluminum narrowline doors are striking [illegible] appearance. Their clean-cut design permits great [illegible] strength without bulk and provides maximum light or [illegible] area. The finest extruded aluminum is used: alloy 6063 [illegible] Components such as rods, screws and nuts are made of [illegible] plimentary material, machine cut and fit for accuracy [illegible] tightness. Available in natural or aluminum finish. All [illegible] ware included.

Furnished as stock packaged single doors only, with [illegible] ware, with or without frame and with or without frame [illegible] fixed transom. Also available as double doors with hardware, with or without frame and with or without frame and [illegible] transom.

Stock single door packaged units in following [illegible] 2'6"x7'0", 3'0"x7'0", 3'6"x7'0". Double door packaged [illegible] in following sizes 5'0"x7'0", 6'0"x7'0", 7'0"x7'0". With [illegible] without frames and transom.

Custom doors are available for most requirements. It is suggested that detailed drawings be submitted for [illegible] quotation.

Marmet also constructs and furnishes complete entrances as specified. Specifications and details on request or see [illegible] catalog in Sweet's Files,

aluminum covered doors

Marmet anodized aluminum covered doors are designed to meet the demand for a sturdy, neat, economical, quality door for schools and other institutions. They can be used with metal or wood construction. Core is of the finest ponderosa pine and conforms to National Door Manufacturers' Specifications. Toxic treated, these doors are covered with special .040 anodized aluminum sheet.

Four sizes are stocked, each 1-13/16 in. thick:

(Actual door measurements)

No. 3084 -- 30" x 84"
No. 3684 -- 36" x 84"
No. 4084 -- 40" x [illegible]
No. 4284 -- 42" x [illegible]

Special sizes and finishes available to order.

Complete specifications and details on request.

MARMET CORPORATION
WAUSAU, WISCONSIN

FROM SKYSCRAPERS TO SCHOOLS

Cupples Products Corporation is one of the nation's largest and most successful manufacturers of aluminum windows and doors for schools, hospitals and commercial structures. Our modern fabricating plant, equipped with the best machinery available — including extrusion presses — produces windows of highest standards at economical prices. Cupples Windows are superior in strength, in weight of section, in construction, in weather-tightness, in freedom from maintenance.

Double hung, projected, ribbon, special windows and doors have been furnished on hundreds of buildings throughout the country. Cupples not only produces conventional windows and doors, but also specializes in complete custom-designed metal facades. Today's trend to aluminum "skin" buildings or aluminum "curtain walls" has been greatly accelerated by the economical and practical solution of this type of construction by the Cupples engineering and fabricating groups. These same designers and consultants are ready to help architects on any of their problems with aluminum façade or window designs.





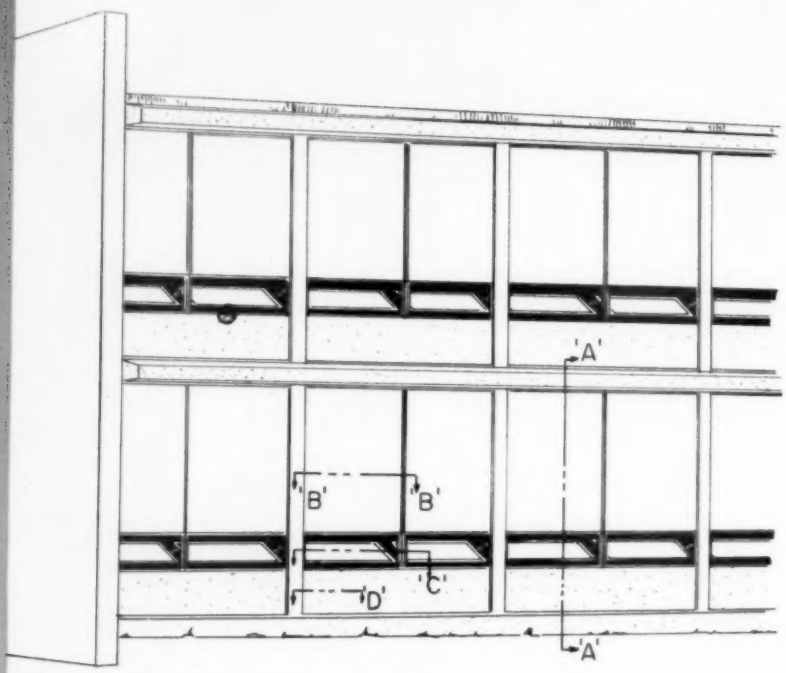
CUPPLES PRODUCTS is a versatile aluminum sash and metal facade fabricator. The New York skyscraper (Webb & Knapp, 116 W. 34th St.) shown above, is an example of Cupples economical aluminum "skin" construction. Low in cost — free from maintenance — inside cleaning of sash. The General George W. Wingate High School, Brooklyn — one of the most unique public schools ever built — is just another of many such jobs turned out by Cupples, where only the finest special double hung and projected sash were considered by architects and owners.

Cupples PRODUCTS CORP.

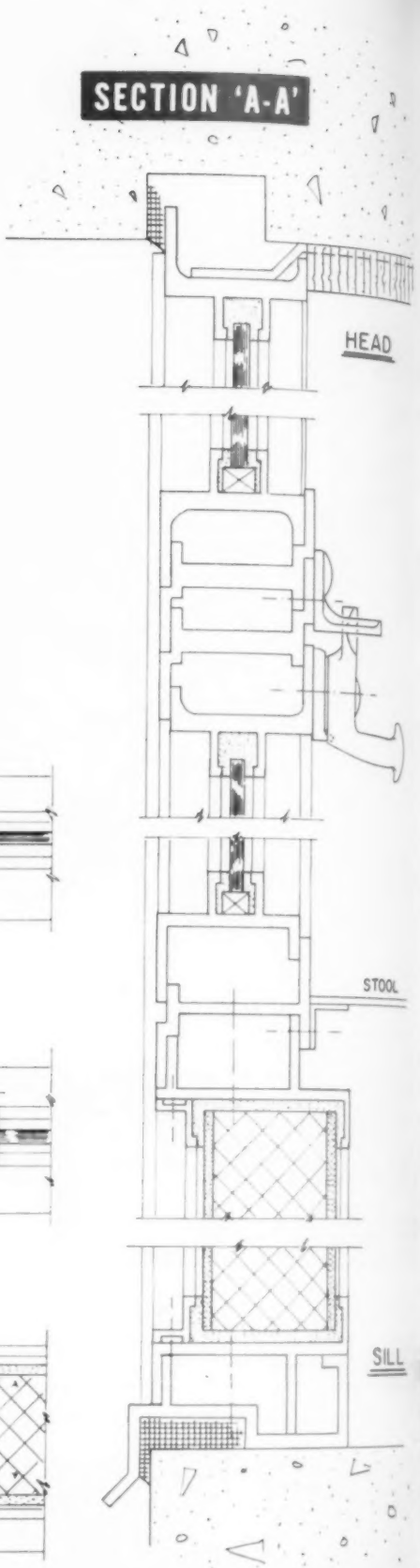
2650 South Hanley Road
Maplewood, St. Louis 17, Mo.

QUALITY APPROVED

SUGGESTED PANEL DETAILS OF A SCHOOL

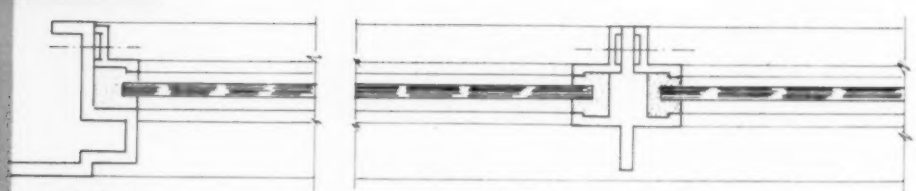


SECTION 'A-A'



SECTION 'A-A'

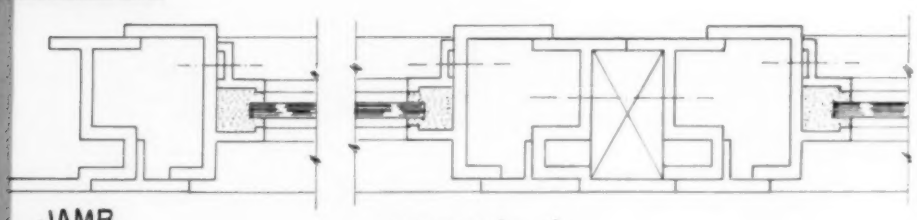
SECTION 'B-B'



JAMB

SECTION 'B-B'

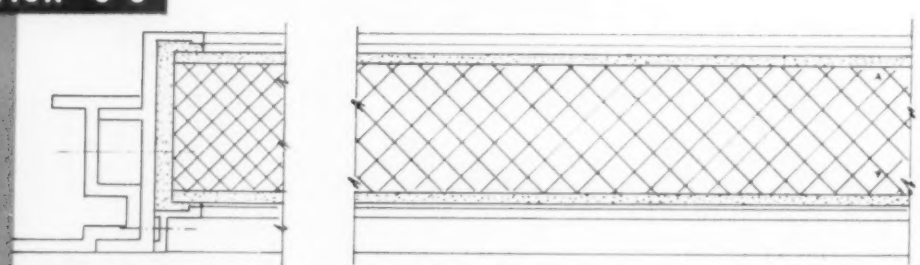
SECTION 'C-C'



JAMB

SECTION 'C-C'

SECTION 'D-D'

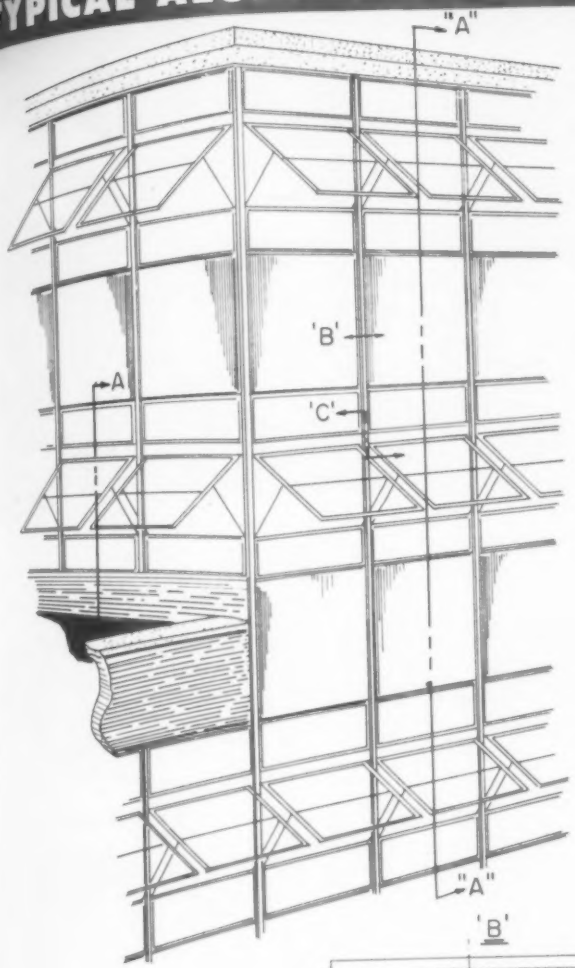


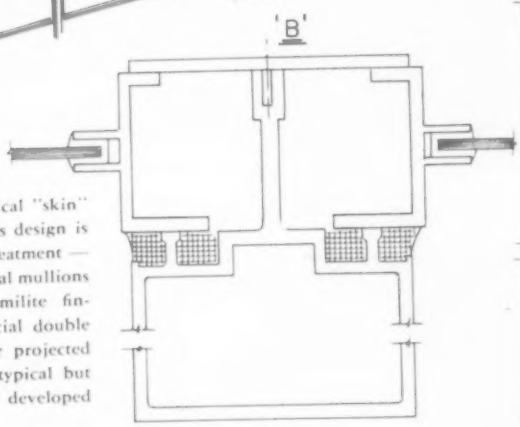
JAMB

SECTION 'D-D'

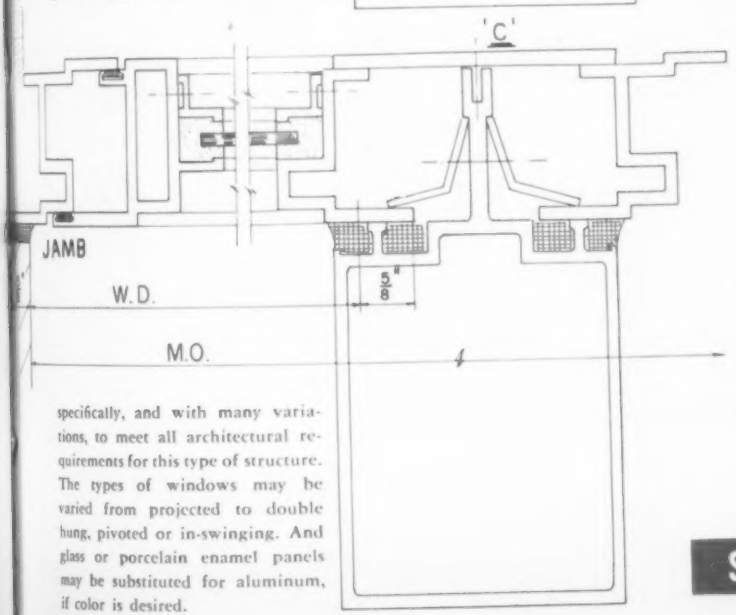
A low cost treatment of aluminum hopper and fixed sash in conjunction with insulated panels. Panel thickness may be varied from 2" to 1⅛" depending upon the requirements. Many times in this type of construction, the interior finish of the panel is such that it can be painted, thus becoming the finish wall of the classroom. Aluminum, porcelain enamel, Cemesto Board, glass or many other materials can be used as panels. Various mullion designs may be adopted to obtain varying architectural effects. Similar construction is available with any type of projected, double hung or special windows depending upon the architect's requirements.

TYPICAL ALUMINUM "SKIN" DETAILS

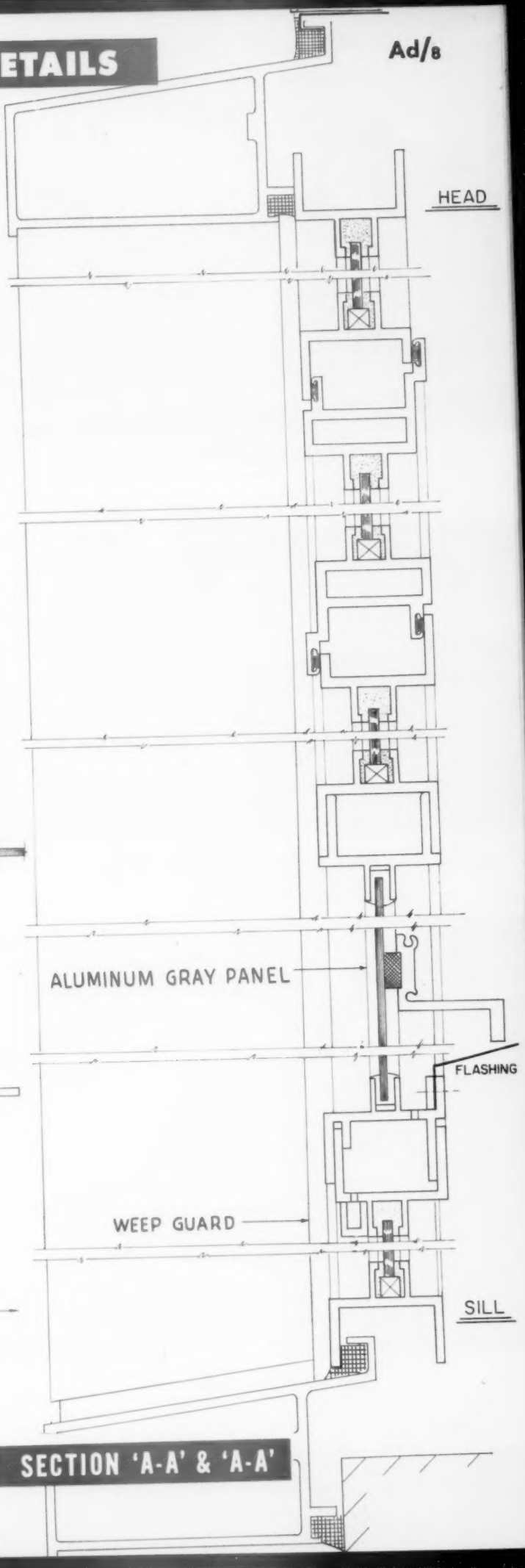




A practical and economical "skin" building. The key to this design is simple architectural treatment — hollow extruded structural mullions — contrasting gray alumilite finished panels — and special double weatherstripped, tubular projected sash. These details are typical but general. They can be developed



specifically, and with many variations, to meet all architectural requirements for this type of structure. The types of windows may be varied from projected to double hung, pivoted or in-swinging. And glass or porcelain enamel panels may be substituted for aluminum, if color is desired.



SECTION 'A-A' & 'A-A'

CUPPLES WINDOWS CHOSEN FOR THESE SCHOOLS

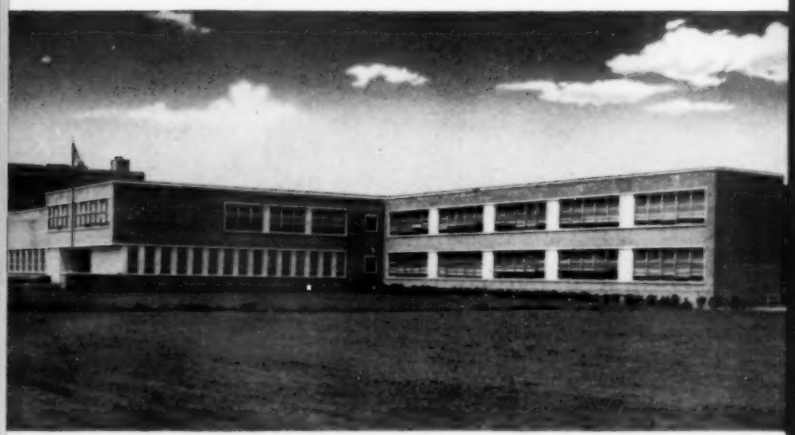
. . . and for thousands of other structures from coast-to-coast



FIELD HOUSE, MARYWOOD COLLEGE
Scranton, Pa.
Architect: Henry D. Dagit & Sons, Philadelphia



BEITEL SCHOOL
Laramie, Wyoming
Architect: Hitchcock & Hitchcock



THOMAS J. RUSK JUNIOR HIGH SCHOOL
Dallas, Texas
Architect: George L. Dahl, Dallas



NOVITIATE MISSIONARY SERVANTS OF THE MOST BLESSED
3501 Solly St., Philadelphia, Pa.
Architect: Henry D. Dagit & Sons ,1329 Race St., Philadelphia



COLONIE SCHOOL
Colonie, New York
Architect: Ryder & Link



LIBRARY, UNIVERSITY OF HOUSTON
Houston, Texas
Architect: Cameron Fairchild

CUPPLES PRODUCTS CORP.

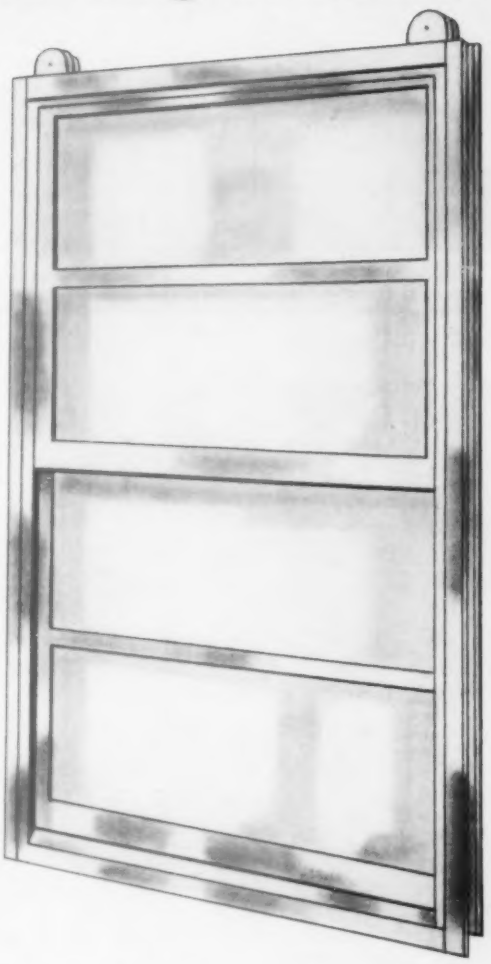
2650 South Hanley Road • Maplewood, St. Louis 17, Mo.

WINDALUME CORPORATION

Kenvil, New Jersey

Windalume

Aluminum Double-hung Windows



QUALITY APPROVED:

Tested and approved for air infiltration and strength of sections by Aluminum Window Manufacturers Association.

Double Hung Series 300—designed to meet Specification DH-A3 of the Aluminum Window Manufacturers Association, 12 gauge (.080) sash and frame, 8 gauge (.128) sill.

Double Hung Series 100—designed to meet Specification DH-A2 of the Aluminum Window Manufacturers Association, 14 gauge (.064) sash and frame, 8 gauge (.128) sill.

"The Welded Window"

All joints of sash and frame both mechanically joined *and* welded for extra strength.

Each window is custom built by skilled craftsmen and incorporates the ultimate in modern window design and construction. Extra strength is built in to assure years of maintenance-free service under severe operating conditions.

NO PAINTING OR MAINTENANCE EXPENSE *EVER* WITH WINDALUME ALUMINUM WINDOWS

IMPORTANT FEATURES

WEATHERSTRIP—Double contact stainless steel at jambs. Stainless steel or woven pile (optional) on horizontals.

BALANCES—Overhead or spiral type may be used.

NYLON SASH GUIDE BLOCKS—Used throughout, assure continuous, easy and quiet operation.

BEAD GLAZING—From inside, permits use of ⅛" or ¼" glass or ½" double glazing.

HOPPER VENTS—In sash or below it. Also transom windows, fixed windows, full and half screens and storm sash.

HOSPITAL SILL—For Controlled draft-free ventilation.



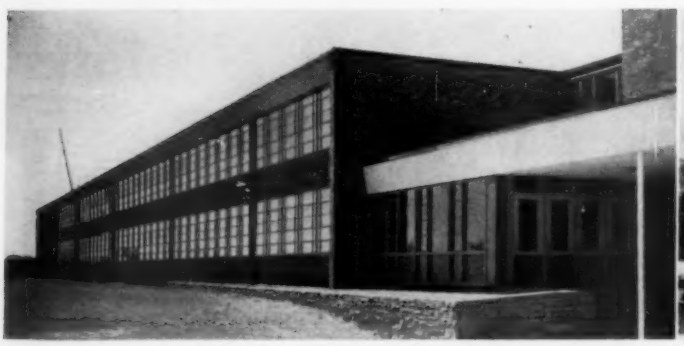
WRITE FOR CATALOG OR SEE OUR CATALOG IN SWEETS

MICHAEL FLYNN MANUFACTURING CO.

Manufacturers of Lupton Metal Windows

Main Office and Plant: 700 E. Godfrey Ave., Philadelphia, Pa.

Home Office and Plant: 700 E. Godfrey Ave., Phila. 24, Pa.; New York: 51 E. 42nd Street, New York 17, N. Y.; Los Angeles: 672 S. Lafayette Park Place, Los Angeles 57, Cal.; Western Warehouse: Stockton, California; Washington: Bond Building, 14th St. & New York Ave., Washington 5, D. C.



Jack C. Hardy Junior High School, Jackson, Mississippi. Architect: Biggs, Weir & Chandler, Jackson, Mississippi. Gen'l. Contractor: W. G. Wetmore, Jackson, Mississippi. Lupton Architectural Projected Windows (Steel)



Martin Luther Christian Day School, Pennsauken, New Jersey. Architect: William Dean Faint, Pennsauken, New Jersey. Contractor: Mark V. Kane, Merchantville, New Jersey. Lupton Master Aluminum Windows.



Riverside Elementary School, Warwick County, Virginia. Architect: Samuel N. Mayo, Richmond, Virginia. Contractor: Endebrock & White Company. Lupton Architectural Projected Windows (Steel)



St. Andrews Parochial School, Newtown, Pa. Architects: Haag & d'Entremont, Jenkintown, Pa. Contractors: Tichenor Brothers, Newtown, Pa. Lupton Architectural Projected Windows (Steel)

Lupton Metal Windows in Thousands of Schools

In big schools, in little schools . . . in the East, the West, the North and the South, Lupton Metal Windows are contributing toward good design, better ventilation and building economy.

The slim frames and muntins of sturdy metal offer minimum visual interference while maintaining maximum strength. Efficiently designed ventilating sash give years and years of trouble-free service. They will never warp, swell, shrink or rattle. Lupton Metal Windows have a timeless beauty that will never become dated. A choice of ventilator arrangement and muntin placement makes it possible to adapt the windows to complement any architectural style.

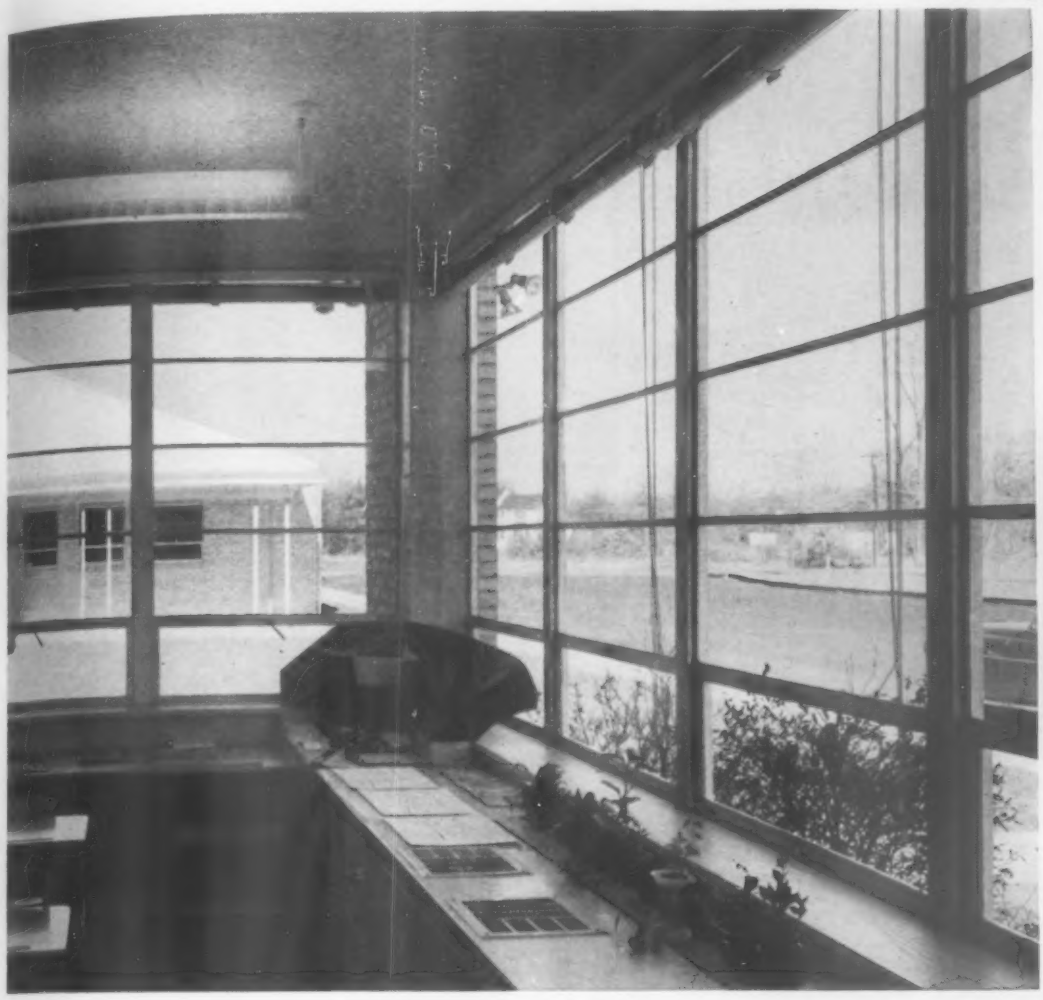
Schools are a long-term investment. Insure that investment window-wise with Lupton Metal Windows. Their quality and service record is backed by over 40 years experience in the designing and manufacturing of metal windows.

Write direct for '54 General Catalog.

LUPTON METAL WINDOWS

MICHAEL FLYNN MANUFACTURING CO.





Coleytown District School, Westport, Conn. Architect: Lyons & Mather, Bridgeport, Conn. Contractor: William J. Lyons Co., Inc., Norwalk, Conn. Windows: Lupton Master Aluminum Projected Windows.



Standardized for savings . . .

There are no dark corners in this new school. Continuous bands of Lupton Master Aluminum Projected Windows flood every room with natural daylight. The windows are standard in design and construction, but with ventilating sash at the sill only. In effect, custom windows, without the premium of custom prices.

This saving, through adaptability of standard designs, is one of many gained when Lupton Windows are specified. Long window life means additional savings. The extra deep members of Lupton Master Aluminum Projected Windows assure the strength needed in the over-size windows popular today. Maintenance savings are considerable too. These aluminum windows will never need paint. They'll never get paint clogged, will always work with precision and ease. There are savings in construction time too. Light in weight and accurately made, Lupton Master Aluminum Projected Windows can be installed quickly, with minimum labor . . . when you add all these savings, you'll rate Lupton Windows a "best buy".

Initial cost is moderate—maintenance extremely low—for increased savings through the years. Ask your architect to specify Lupton Master Aluminum Windows, or write direct to—

MICHAEL FLYNN MANUFACTURING CO.
700 East Godfrey Avenue, Philadelphia 24, Pa.

LUPTON METAL WINDOWS

TRUSCON® STEEL DIVISION
REPUBLIC STEEL

1110 ALBERT STREET • YOUNGSTOWN 1, OHIO

Manufacturers of a complete line of steel windows and mechanical operators. Steel joists • • • Metal lath • • • Steeldeck roofs • • • Concrete reinforcing bars • • • Welded wire fabric • • • Steel inserts • • • Residential, Industrial and Hangar steel doors • • • Steel buildings • • • Radio towers.

TRUSCON CLASSROOM WINDOWS

Especially designed for school use



Truscon Intermediate Steel Classroom Windows installed in Bath Township School, Allen County, Ohio, have upper lights of efficient diffusing pattern glass with lower lights clear. Architect, Robert A. Helser; Contractors, Bitler Brothers Construction Co., Lima, Ohio.

★ **Improved Lighting**

★ **Increased Ventilation**

★ **Low Cost**

★ **Easy to Maintain**

The new Truscon Intermediate Classroom Window first was presented to school administrators and architects in 1950. It immediately won enthusiastic acceptance. Today, many installations testify to its effective performance under widely varying climatic conditions.

Truscon Intermediate Classroom Windows are recommended for school window openings to obtain a light diffusive glass area in the upper portion with a bottom metal window vision and ventilating strip glazed with clear glass. Advantages are: (1) substantially increased light effectiveness, (2) better ventilation, (3) marked economy in original cost, and (4) superior maintenance from the standpoint of window washing and replacement of broken glass.

TRUSCON STEEL DIVISION

TRUSCON STEEL CLASSROOM WINDOWS



Exterior view showing Truscon Intermediate Steel Classroom Windows installed in Mark Twain School, Poplar Bluff, Missouri; Architect, Glen M. Drew; Contractor, Semo Construction Company, Sikeston, Missouri.

Point for point, this Truscon window development offers greater flexibility, more efficient use of nature's free sunlight and fresh air and greater simplicity of maintenance than any other type of classroom window.

Your choice of glazing is completely adaptable to geographical location, climatic conditions and degree of exposure. Choose efficient diffusing glass, double insulating glass, heat absorbing glass or glare reducing glass. All glass may be installed from the inside. Ventilators may extend the full height of vision strip or only one-half the height, as desired.



New daylight effectiveness . . . new classroom efficiency . . . thanks to Truscon Intermediate Classroom Windows in Mark Twain School, Poplar Bluff, Mo.

Truscon Intermediate Classroom Windows are custom built in integral units with widths ranging from 3 feet to a maximum of 8'3". Heights are limited to 9'0". They are fabricated, Bonderized and painted to the same exacting specifications as are other Truscon Intermediate Windows. Write for fully illustrated literature giving you complete details on this Truscon window innovation. It is one of the complete Truscon line of steel building products . . . all backed by a fifty-year reputation of outstanding service to the building industry.

TRUSCON
MARK OF MERIT PRODUCTS

REPUBLIC STEEL

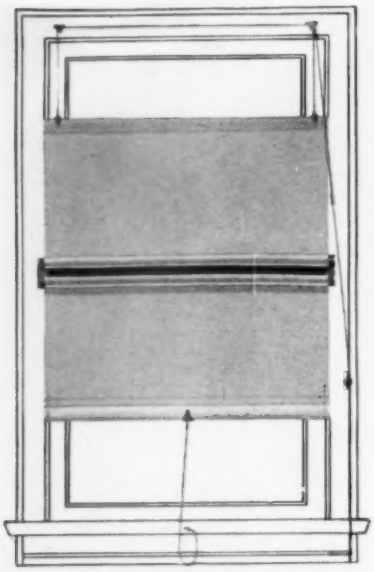
TRUSCON STEEL DIVISION
REPUBLIC STEEL
1110 ALBERT STREET • YOUNGSTOWN 1, OHIO
Export Department: Chrysler Building, New York 17, New York

TRUSCON a name you can build on

JOANNA WESTERN MILLS COMPANY

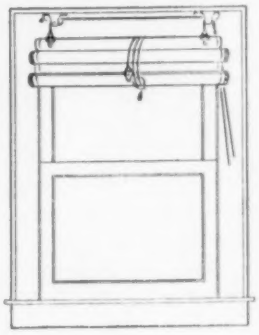
22nd and Jefferson Streets, Chicago 16, Illinois

WINDOW SHADES AND INSTALLATIONS SPECIALLY DESIGNED AND CONSTRUCTED FOR SCHOOL USE

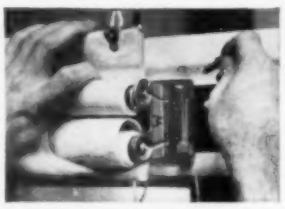


DIPLOMA Window Shade Installation • No. DI 7000

Joanna's most practical school installation, designed to withstand all the extra wear caused by careless handling. Engineered for heavy duty, ease of operation, trouble-free service and precise control of light and ventilation.

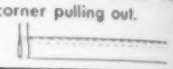


Patented Diploma demountable light strip is locked in place with flat metal keys. Entire assembly swings free of window and may be raised to facilitate window cleaning and prevent damage during repairs.

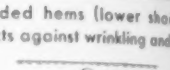


OTHER DIPLOMA FEATURES THAT INSURE BETTER PERFORMANCE

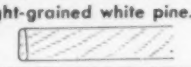
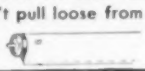
Side hem reinforcement—Prevents hem corner pulling out.



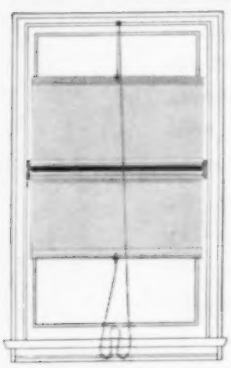
Extended hems (lower shade)—Protects against wrinkling and tearing.



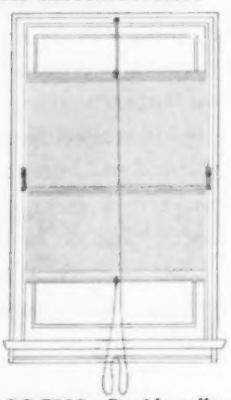
Diploma is also available for single shade installations—No. DI 7100

1¼ Slats—Oversized, heavy duty, straight-grained white pine. 	Adjustable control cord—Simplified adjustment to correct level of upper shade. 	Cloth sleeve for roller (lower shade)—Won't pull loose from roller. 	Snap-on cord attachment—No eyelet to weaken slat—no unsightly cord ends. 
Cord ends looped and metal bound—No knotted, frayed ends.	Two pulleys—Extra large rustproof roller for smooth, quiet operation. 	Standard guaranteed rollers—Finest, heavy duty rollers for long wearing, smooth rolling action.	Two point suspension (upper shade)—Easier operation, prevents twisting, turning or damage when drawn over open window.

Other Joanna Western Installations:



LS 7200—Double roller center light strip installation. Telescoping metal light strip at center of window. Single cord suspension, constant tension roller and stop pulley on upper shade.



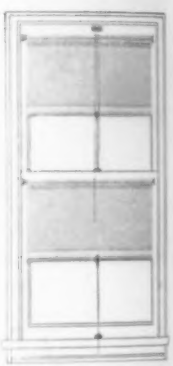
OC 7300—Double roller overlapping center installation. Single cord suspension, constant tension roller with stop pulley on upper shade. No light strip...shades overlap at center of window.



SI 7700—Standard single shade installation. Most common type of installation. Consists of single shade suspended from the top of the window by inside or outside brackets.



SU 7400—Suspended assembly single shade installation. Permits opening window from top or bottom without interrupting free flow of air. Assembly can be raised or lowered to any point and locked.



AU 7500—Shades for austral windows. Metal brackets attached to individual window section with single notch rollers operating on constant spring tension. Positioned by stop pulleys on lower frame.

These installations give satisfactory performance under most conditions. However, where long service under rugged conditions is desired we recommend the DIPLOMA installation.

JOANNA WESTERN WINDOW SHADES



VIKING—

Vinyl plastic coated cambric, washable, flameproof.

Designed and manufactured especially for schools where window shades are exposed to constant operation and hard use, VIKING offers more service at lower cost because maintenance costs are less and replacements are few. Made from closely woven 140 count cambric with no filling so it can't crack or pin-hole. Waterproof, flameproof vinyl plastic provides a smooth, dust repellent surface that washes easily with soap and water. Extremely resistant to sunlight and repeated scrubbings without damage to fabric, finish or color. VIKING is flameproof ... it will char slowly in a direct flame, combustion ceases instantly when flame is removed with no after glow. Available in a variety of colors from chalk white (won't yellow with age) to popular tones of eggshell, tan and green. VIKING is the best shade for every school installation.

Available in widths up to 72 inches.



EXLITE—

Washable, flameproof, room-darkening cambric.

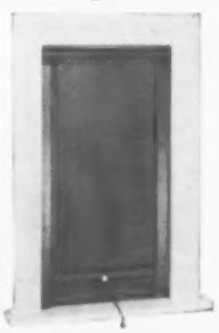
For visual education rooms, laboratories, auditoriums ... any room requiring darkness. EXLITE is made of strong, flexible 140 count cambric, sealed and opaqued with waterproof, flameproof vinyl plastic. Finished in a complete variety of light colors, *on both sides*, in standard color tones, so that uniform color may be maintained throughout the building, even when room-darkening is required only in some rooms. Extremely durable, resists cracking and pin-holing throughout years of use. Waterproof resin colors provide a velvet smooth finish that allows little opportunity for dust particles to collect. May be washed as often as necessary, using a damp cloth or scrubbing with soap and water for stubborn spots.

Available in widths up to 54 inches. Wider widths up to 150 inches supplied in hand made SHADOWPROOF.

Where *complete* darkness is desired, specify Joanna Western DARKO.



DARKO DELUXE MODEL—DE 7800—Absolute Room Darkening. Recess or face mounted. Side and bottom channels and roller housing at top prevent light cracks around edges.



DARKO STANDARD MODEL—ST 7900—Recess or face mounted—uses a minimum of equipment. Side channels and "Rumple Cloth" apron at bottom seal out extra light.

Other recommended Joanna Western Window Shades:

VICTOR—Hand painted window shade cloth. Available in all popular colors in widths up to 150".

SERVICE—Cotton duck, flameproof, vat dyed. Available in tan and black in widths up to 68".

EXCELSIOR—Washable, machine painted print cloth in a variety of colors in widths up to 54".

COMMANDER—Vinyl plastic coated duck cloth, washable, flameproof. Available in tan and black in widths up to 65".

Sample books showing complete range of these and other Joanna Western Window Shade Cloth available at no charge on request.

JOANNA WESTERN WINDOW SHADE ROLLERS—A shade is only as good as its roller. For this reason, Joanna makes it own rollers of a quality comparable with other Joanna products.

NEW IMPROVED "LEVELINE" CONSTRUCTION on all standard wood and metal rollers. New multi-stop ratchet for quicker, more positive stopping action keeps shades level—can be stopped and evened each ¼ inch. Smoother rolling action.



Old type roller — New "Leveline" Roller

STANDARD "LEVELINE" WOOD ROLLERS—Metal parts are plated and rustproof.

STANDARD "LEVELINE" METAL ROLLERS—Especially recommended for larger type shades.

For the name of our dealer in your area, write our nearby branch office. When special problems of light control are encountered, we invite you to consult with our Architects and Institutions Service Department.

JOANNA WESTERN MILLS COMPANY

Executive Offices, Architects and Institutions Service Department: 22nd and Jefferson Streets, Chicago 16, Illinois

NEW YORK SALES OFFICE: 261 Fifth Avenue, New York 16, New York. EXPORT OFFICE: 1 Exchange Place, Jersey City 2, New Jersey, U. S. A.

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313 S. 11th Street

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701 Seneca Street

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COLUMBUS COATED FABRICS CORPORATION

Dept. U-14, Columbus, Ohio

THIS IS AN ACTUAL SAMPLE OF

Bontex

FLAME RESISTANT SHADE CLOTH

It is permanently fire-resistant for the life of the cloth — the fire retarding materials will not wash out or wear out. Bontex flame resistant shade cloth meets the rigid specifications of the Boston Fire Department. In achieving this important safety feature, all of the established Bontex qualities of fine appearance and washability have been retained.

Clip off swatch at dotted line and test its fire resistance with a lighted match. Then give it these tests: Boil it, scrub it, twist it, crush it, TREAT IT ROUGH. Hold to light. No fading, pinholing, or fraying.

Many types of Bontex. Newest of the many types are Bontex Darkening Shades, ideal for showing slides or films—and Fire-resistant Shades for added safety. (See swatch) These newer shades and other types of Bontex—translucent, semi-opaque and opaque—are available in a range of colors. Opaque, which is absolutely black, excludes all daylight.



Free sample book.
Shows the complete Bontex line of solid and duplex colors, corded and printed designs, utility and decorative shades for schools, homes, every type of building. Sample Book is free to school officials and architects. Write for it.

Bontex

window shade cloth

Serves better, saves money! Bontex meets the two basic requirements of better light without glare —and finest quality for long wear. It's pyroxylin impregnated, tough and durable, withstands rain, snow, wind, and careless handling in schoolrooms. Does not pinhole, fray or crack. Bontex has been used nationally in schools for over 20 years.



Cleans like new. The pyroxylin becomes a permanent part of the high-thread-count muslin base. Non-porous finish repels dirt. Easy to clean, can be scrubbed with a brush 20 times or more. Bontex stays beautiful for years.

Clear, clean colors. All Bontex colors are clear and uniform to screen the sun properly. Bontex quality is the highest—your best window shade investment.

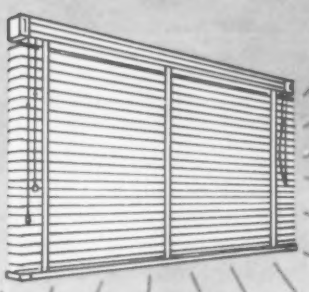
Brooklyn Technical High School, Brooklyn, N. Y.

One of many Bontex Installations in schools

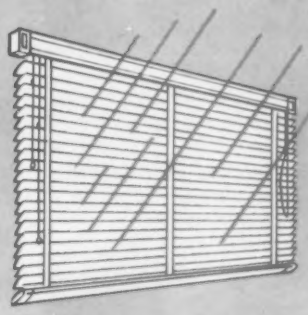


A GOOD VENETIAN BLIND GIVES...

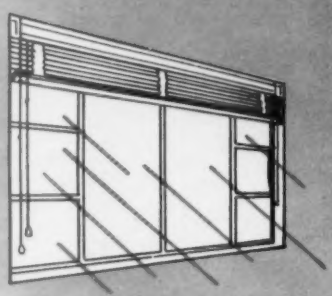
3 WAY LIGHT CONTROL



With slats horizontally level, sunlight is diffused throughout the entire room, eliminating contrasting glare and dark corners.



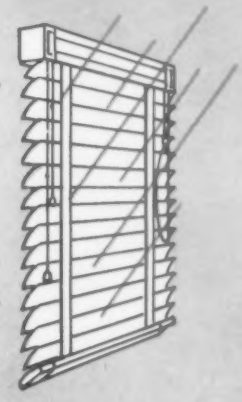
On bright, sunny days, with slats tilted upward, light is diffused, softening direct glare by giving indirect light.



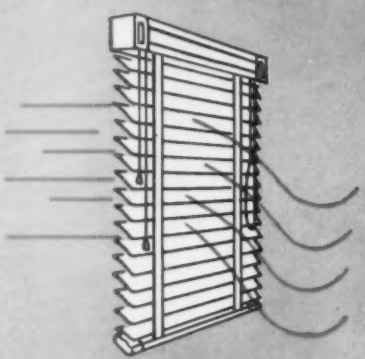
On cloudy days, Venetians can be fully raised to let in every bit of available daylight.

Ventilation Control



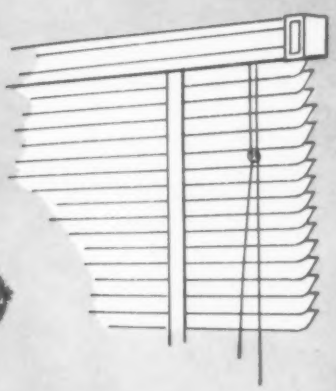


In winter, slats tilted upward, deflect direct draft and circulate the warm air trapped at the ceiling.



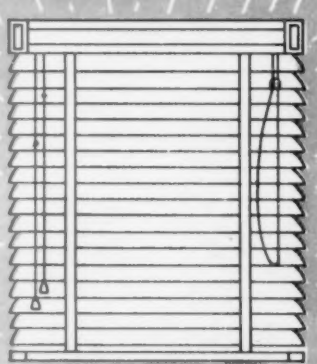
In summer, slats tilted downward, deflect the air toward the floor, and give cooling air flow with no direct draft.

Decorative Beauty



No other window covering offers such smart cheerfulness. When additional decoration is not desired, no extra treatment is necessary to add to their natural beauty.

and Sanitation



Today's Venetians clean easier and stay clean longer. Hard plastic finishes will not let dirt grind in. Slats are merely tilted and dusted or vacuumed. Cleaning presents no harder problem than any other furnishings.

LEVOLOR Trade Mark Levolor Lorentzen, Inc.

Custom Venetians give all these advantages because every part has been CAREFULLY ENGINEERED AND TESTED

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COLUMBUS COATED FABRICS CORPORATION

Dept. U-14, Columbus, Ohio

Bontex

window shade cloth

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Brooklyn Technical High School, Brooklyn, N. Y.

One of many Bontex Installations in schools



The high quality of Bontex means real economy in window shades. Because Bontex Shades are beautiful, durable, economical and provide better light control, they are used in many of America's finest schools.

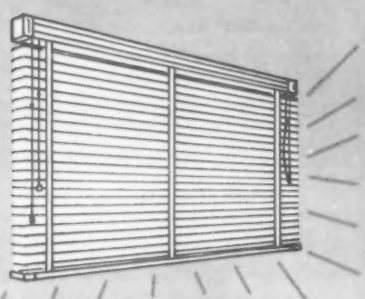
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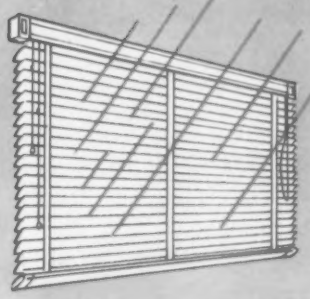
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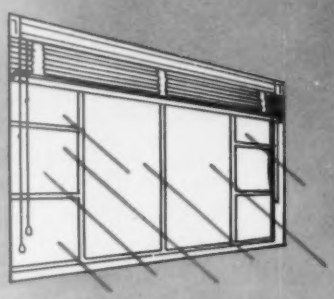
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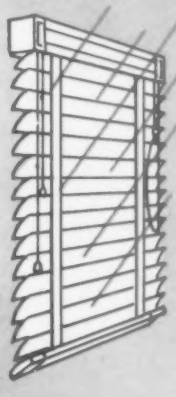
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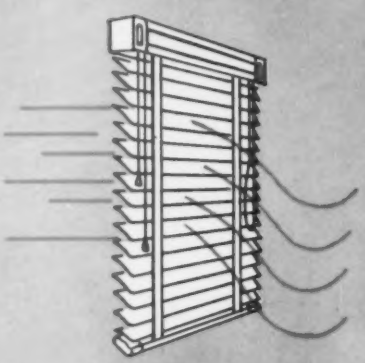
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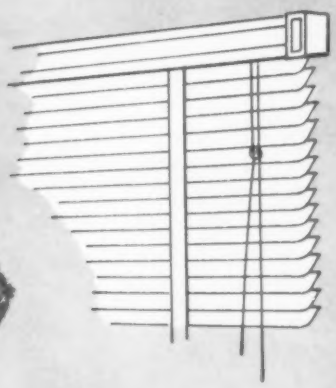


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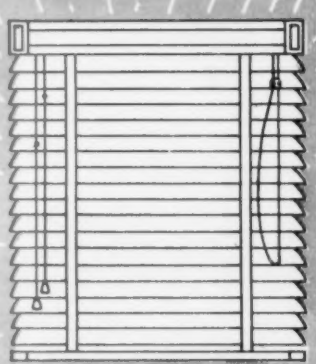
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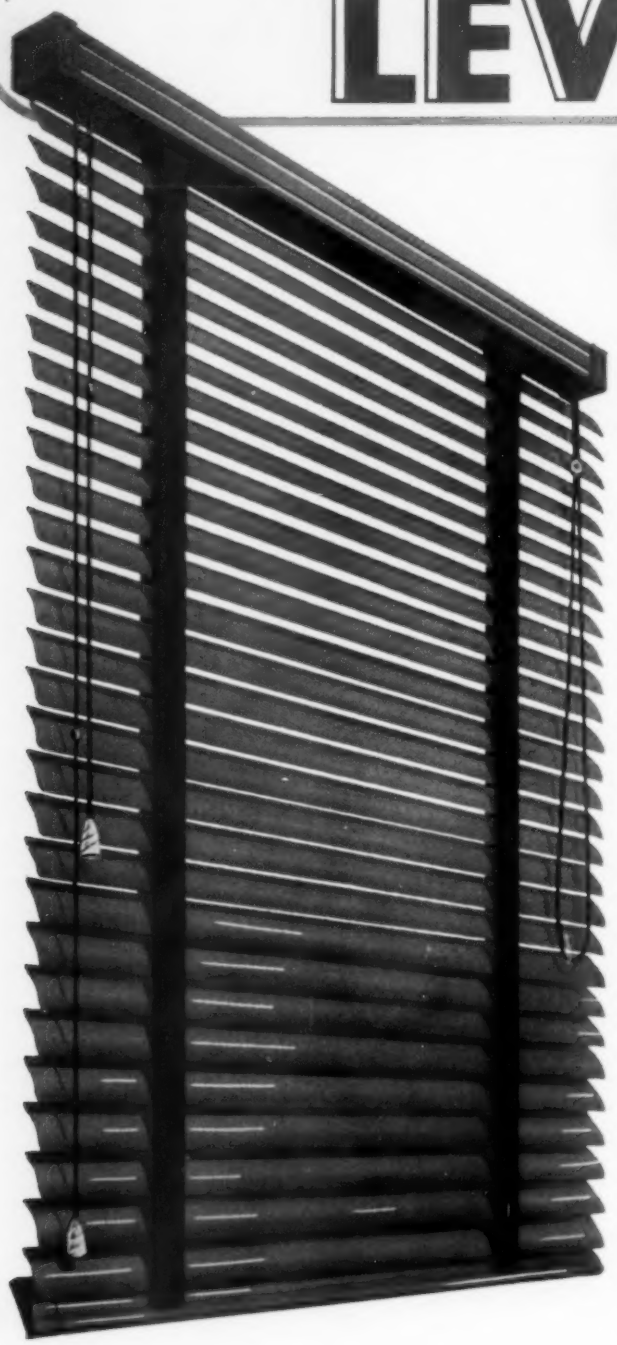
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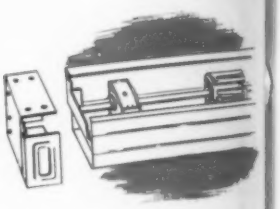
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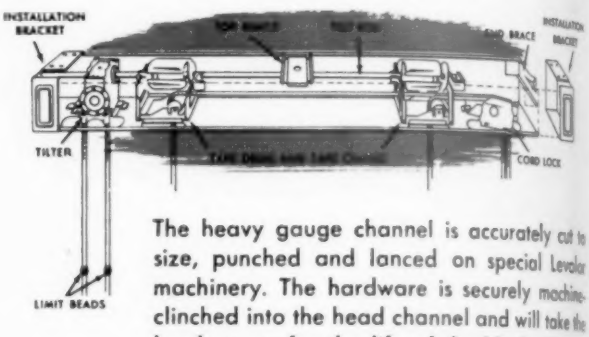
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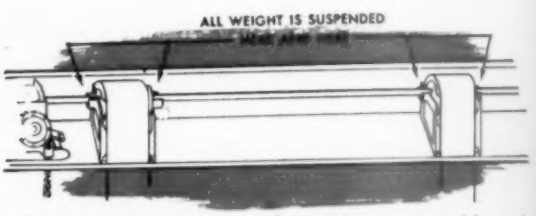
Installation and Maintenance Costs Depend on the Head

The head is the "works" or brains of a Venetian Blind. In it is the responsive mechanism that raises, lowers or tilts the slats—in its design and mechanics rest the economy of installation, long life and functional value. Levolor hardware has been known for over twenty years as precision engineered. There is none finer.





The heavy gauge channel is accurately cut to size, punched and lanced on special Levolor machinery. The hardware is securely machine-clinched into the head channel and will take the hardest use for the life of the blind. All hardware is tomized to resist corrosion.



The tilter operates as an independent unit and has only one function—to tilt the Venetians. All weight is suspended from the tape drums which turn in a tape cradle, offering minimum friction, thus the entire weight of the blind exerts no pressure on the tilter and gives effortless operation to the heaviest blind.

The largest single source of maintenance cost is the tilting device. Tilt cords creep out of reach and the blind becomes useless. THIS CANNOT HAPPEN TO VENETIAN BLINDS equipped with SELF-ADJUSTING TILTERS which work on the gear and worm escapement principle. Limit beads stop the cord ends from getting out of reach. By pulling the short cord, both tassels become even. As a rule, however, constant use keeps them in an even position automatically—without conscious adjustment.



LEVOLOR The Heavy Duty Venetian for Schools. From the precision made mechanism to the heavy gauge bottom bar, every component in a LEVOLOR Custom Venetian is the result of careful designing, engineering and quality controlled production.

Every manufacturer of LEVOLOR Custom Venetians has been selected because we know him as an able, reliable manufacturer, equipped with the finest LEVOLOR precision machinery. That is why you can safely pick one in your own locality—be sure of the best possible Venetian and a responsible manufacturer.

. . . the Heavy Duty Venetian for Schools!

LEVOLOR ALUMINUM SLATS

Levolor tried to have aluminum slat stock manufactured for them to LEVOLOR specifications, but, in the end, it had to be developed and manufactured in a LEVOLOR factory. Today the quality of LEVOLOR Aluminum Slats cannot be equalled.

TOUGH – REAL TOUGH – BUT NEVER BRITTLE Prime aluminum –cold rolled to compress every fiber into tough, resilient strength. Bend it sharply at the rout holes—keep on bending it and LEVOLOR slat stock will not break because it is tough, but never brittle. This is the result of the cold rolling, a process that compresses the molecules of the metal and eliminates the necessity of heat treating (mis-called tempering), a process that produces brittleness.



THE SHARPEST BEND WILL NOT BREAK IT.



UNIFORMLY 2 INCHES WIDE.

ASSURED PERFECT CLOSURE Inch for inch, foot for foot, every LEVOLOR Slat is a full two inches wide, without twist or cambre. This assures the smooth fit and proper overlap of the slats necessary for perfect closure.



NOT THIS.



BUT THIS.

PERFECT CROWN – NO LONGITUDINAL FLATS. Forming is a metal worker's skill, highly developed by LEVOLOR LORENTZEN over a forty year period. Once again, this experience produces a perfectly formed crown—free of longitudinal flats.

THE LEVOLOR CATALYTIC FINISH Resists corrosion, chipping and marring—because the base metal is etched—back cut, so the base coat is literally *anchored* to a million tiny crevices. Just as a cabinet worker back cuts a joint to make it hold, this Catalytic Process etches millions of such tiny cuts into the base metal to give a solid foothold to the base coat. It's a finish that's on to stay.

THE SMOOTHEST FINISH EVER DEVELOPED When compared under a microscope, the smooth finish of LEVOLOR as against other brands is immediately apparent. And there's a reason—it is an extruded plastic finish, applied under metal squeege pressure. Every bit of paint is *forced* into the slat.

LINEN FRESH — THE PRACTICAL FINISH FOR SCHOOLS

Now in use in schools, leading hotels and other institutions—the LINEN FRESH pattern. This design looks so much like linen that one must feel it to know it is serviceable metal—in a non-gloss finish to stop glare and reflection. This finish has been chosen by many institutions because of its ability to minimize cleaning. It may be matched perfectly in the LEVOLOR head, bottom bar and slats.



ALL LEVOLOR SLAT STOCK IS DELICATELY EMBOSSED EVERY 17 INCHES – LEVOLOR

THE LEVOLOR METAL BOTTOM BAR



Probably the most outstanding advancement in Venetian Blind engineering—the LEVOLOR enclosed bottom bar gives that final graceful touch and adds greater weight for lowering of blinds—eliminates the old-fashined hard-to-clean wood. No bunched tapes, no tacks, staples or unsightly clips. Tape ends just disappear into the bar. Finished off with LEVOLOR plastic end caps, it offers a modern sanitary bottom bar that looks beautiful and stays beautiful.

TRIPLE "U" RIGIDITY
Bottom bars must have weight to lower properly, rigidity to minimize bowing. This cross section shows why the Levolor bottom bar has the proper rigidity and weight.

THE TAPE DISAPPEARS
into the bottom bar. There are no clips or protruding metal to mar or scratch sills. Plastic end caps offer further protection.

SLIDE-IN TAPE ANCHOR
This style leaves the top of the bar perfectly smooth. The tape anchor is under the slat.

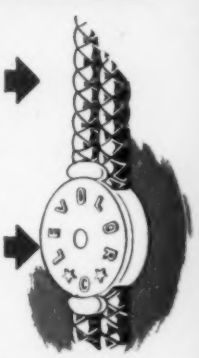
CLIP-ON TAPE ANCHOR
This style allows quick adjustments to the fraction of an inch after the blinds have been installed. Either style can be specified with confidence.



Refined to the Smallest Detail

Levolor cord was developed by Levolor and is made in Levolor's own factory. Like the head, LEVOLOR quality is identified by a blue or orange center strand. Levolor Cord may be had in either cotton or nylon, both meet the most rigid specifications and may be specified with confidence.

Only Venetian Blinds meeting LEVOLOR specifications may be identified by the Medallion Cord Equalizer. The equalizer, a radical departure from the old metal type, not only adds beauty and identification, but has a functional value. Lift cords may be easily adjusted by pulling the necessary cord.



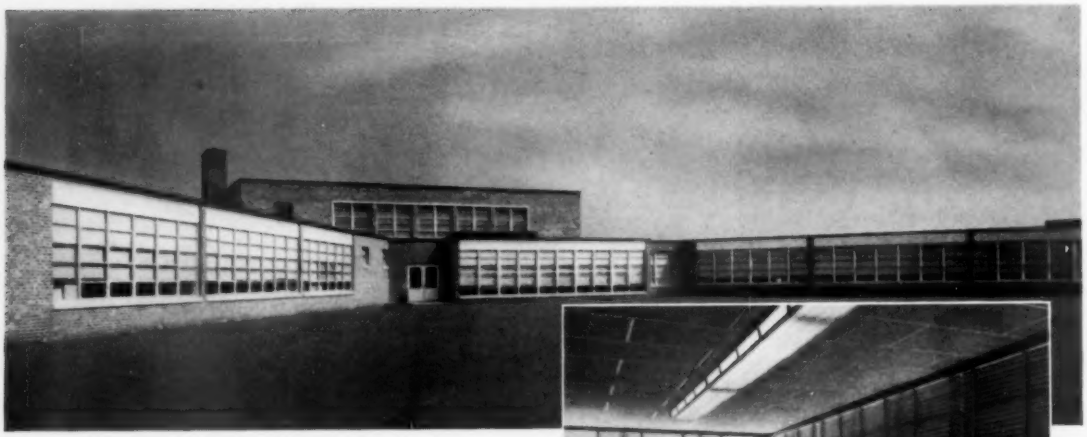
From a foremost designer comes this distinctive spiral tassel. Generously proportioned to give ample grip, it is molded of the finest plastic to take the severe service of the school—another work of refinement and the thought placed behind every LEVOLOR product.



To give protection to the sills and sash —this graceful plastic end cap perfectly matches the slats, head and bottom bar. Its ability to prevent scratching and denting of woodwork will be appreciated by the fastidious.



LEADING ARCHITECTS SPECIFY LEVOLOR





All of the windows in the new South Grove School, Syosset, New York, are fitted with Levolor-built Venetians in the new Linen-Fresh finish. This smart finish was chosen for schoolroom use because it projects light properly throughout each room without glare, and because it minimizes cleaning maintenance. Like most modern schools, the South Grove School devotes most of its wall space to windows. That schools are specifying Levolor is a tribute to the performance record of these Venetians, the smoothest-operating Venetians obtainable.

South Grove School
Syosset, New York
Arch: Louis E. Jallade
Gen. Cont.-Fischer-Hall

Chico State College (addition)
Chico, California
Div. of Arch., State of Calif.

University of California
Aquarium Museum Bldg.
La Jolla, California
Arch: Frank L. Hope
(Office of Arch. & Engr., U. of Calif.—Supervising Arch.

Monroe County Schools:
Poinciana Elementary School
Reynolds Elementary School
Douglas High School
Key West High School
Key West, Florida
Sue Moore Elementary School
Marathon, Florida
Coral Shores Elementary School
Plantation Key, Florida
Arch: William H. Morrison

University of Michigan:
Out-Patient Clinic Bldg.
Ann Arbor, Michigan
Arch: Giffels & Vallet, Inc.

Queens College:
Science Building
Flushing, New York
Arch: Feltheimer & Wagner

Rush-Henrietta School
Henrietta, New York
Arch: Ade & Todd

Hilton High School
Hilton, New York
Arch: Ade & Todd

University of Rochester (addition)
Rochester, New York
Arch: Waasdorp & Northrop

New York State Dormitory Authority
14 dormitories

A & M College:
Memorial Student Center
College Station, Texas
Arch: Carleton Adams

Colorado Public School
Colorado City, Texas
Arch: Wyatt C. Hedrick

Rice Institute:
W. W. Fondren Library Bldg.
Houston, Texas
Arch: Staub & Rather

University of Houston
Houston, Texas:
Ezekiel W. Cullen Bldg.
Arch: Alfred C. Finn
M. D. Anderson Memorial Library
Arch: Staub & Rather
Dormitories
Arch: Lamar Q. Cato

City County Boys Industrial School
Hutchins, Texas
Arch: George L. Dahl

Liberty Independent High School
Liberty, Texas
(new blind installation)

State College of Washington
Classroom Bldg. and Holland Library
Pullman, Washington
Arch: John W. Maloney

LEVOLOR SPECIFICATIONS

The Venetian blind shall be the Levolor blind. The metal head and bottom bar and all hardware shall be Levolor Orange Line (E-Line). Slats shall be Levolor aluminum slats. Tape shall be Levolor cotton tape, having 88 yarn ends and with 28-30 cross threads of cotton or rayon per inch. Cord shall be Levolor nylon or Levolor blue Label cotton cord. The lift cord shall have a Levolor Medallion plastic equalizer. The tilt cord shall be equipped with Levolor Spiral Design tassels and with cord beads to keep the tassels within easy reach.

WHAT IS HEAVY DUTY? The Venetian described on the preceding pages is the Levolor Orange Line recommended for heavy duty. It is the very finest obtainable with heavier channel and construction throughout than is found on any other venetian on the market today. The LEVOLOR Orange Line is quickly distinguished by the Orange stripe in the head channel. To be doubly safe, specify LEVOLOR Orange Line throughout.

THE LEVOLOR BLUE LINE The LEVOLOR Blue Line is better or equal to all other top quality brands and can be safely specified where money is a factor. The Blue Line can be identified by the Blue stripe on the head channel.

LEVOLOR LORENTZEN, INC.
391 West Broadway, New York 12, N. Y.
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KIMBLE GLASS COMPANY SUBSIDIARY OF OWENS-ILLINOIS

Toledo 1, Ohio



There will be less eyestrain, better work, less fatigue and better morale in this classroom. It gives educators their first glimpse at a long-sought goal—a more wholesome environment for learning.

America's most advanced schoolroom



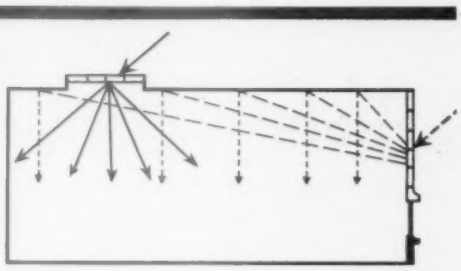
This "classroom of tomorrow" is located at the Daylighting Laboratory, University of Michigan. It offers maximum freedom in design, decoration and choice of equipment.

America's most advanced schoolroom shows you how to bring good daylight to even the deepest parts of rooms

The combination of Toplite Panels in the roof and Light-Directing Glass Block in sidewalls makes it easy to get proper *quantities* of the right *quality* daylight in all areas of the room.

It is no longer necessary to confine close detail work to the area nearest the windows. It is as easy for a child in the deepest corner to read as it is for the child next to the window wall. There is adequate natural illumination even on an overcast day.

The ideas perfected in this "classroom of tomorrow" are available to you, *today*. Write for the details. Address: Classroom Research, Kimble Glass Company, subsidiary of Owens-Illinois, Dept. AU4, Box 1035, Toledo 1, Ohio.



Here is why rooms with panels of Light-Directing Glass Block and Toplite roof panels have exceptionally good daylighting. Light beams striking the Owens-Illinois Glass Block* panel are directed up and back into the room (dotted arrows) for even distribution of diffused light. The toplite roof panels provide selected light transmission from the ceiling. Their light transmitting characteristics eliminate glare and distribute controlled daylight throughout the room no matter what the angle of the sun.

**Formerly known as INSULUX*

GLASS BLOCK AND TOPLITE PANELS

TWO (O) PRODUCTS

OWENS-ILLINOIS

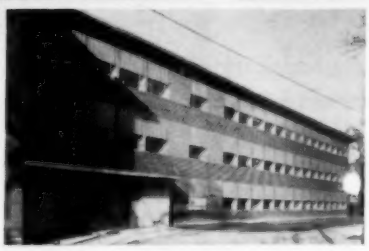
GENERAL OFFICES · TOLEDO 1, OHIO

PITTSBURGH CORNING CORPORATION

Dept. ANG-45, One Gateway Center, Pittsburgh 22, Pa.

Here's better daylighting and good looks ...with PC Glass Blocks





When you **build**

Consult with your architect on the advantages of including PC Glass Blocks in the new buildings you may be planning.





When you **modernize**

If your plans include remodeling old buildings, you'll do well to modernize the window areas by installing PC Glass Blocks.

PC Functional Glass Blocks diffuse and distribute valuable daylight to all areas of the room and there are patterns available to solve every daylighting problem. Panels of PC Glass Blocks impart clean, architectural lines to new buildings, and give a decided lift to the appearance of older structures.

Maintenance costs are kept to a minimum as PC Glass Blocks only have to be cleaned once or twice a year, breakage is practically non-existent and there is no sash to require painting or reputtying. Further savings can be made by the reduced need for window blinds, shades or louvres.

PC Glass Blocks will save plenty of money on operating costs, too. As an example, they have high insulating value (equal to an 8-inch masonry wall) so they reduce fuel costs drastically. For more information, write to Pittsburgh Corning Corporation, Dept. ANG-45.

PC Glass Blocks

PITTSBURGH PC CORNING

ALSO SKYTROL* AND FOAMGLAS*

*T. M. Reg. Applied for.

See our advertisement on page A 19 for information on PC Skytrol Glass Blocks for toplighting.

STRUCTURAL WATERPROOFING CORP.

Builders Building, 228 N. La Salle St., Chicago 1, Illinois • Tel. ANdover 3-2516

DALLAS, MEMPHIS, NEW ORLEANS, OKLAHOMA CITY, NEW YORK

DO YOUR WALLS LEAK?



Lake Forest
High School
Lake Forest, Ill.

keep the water OUTSIDE with SWC Guaranteed, Bonded Waterproofing and Restoration

Use Structural Restoration Methods. If costly damage to your property is to be avoided, your maintenance and modernization program should start with the exterior walls.

Waterproofing arrests and forestalls disintegration to plaster and other interior finishes, rusting of structural steel, steel sash, fire escape anchors, and damage to elevator machinery.

Over thirty years experience in waterproofing, steam cleaning, tuckpointing, caulking and concrete restoration is available to you through our Restoration Methods and Service.

SPECIALISTS IN

Weatherproofing · Building Restoration · Concrete Restoration
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Survey Without Obligation

SWC STRUCTURAL WATERPROOFING CORP.

BUILDERS BUILDING, 228 N. LASALLE ST., CHICAGO 1, ILLINOIS

BRISK WATERPROOFING CO., INC.

103 Park Avenue, New York 17, N. Y.

450 Statler Office Building, Boston 16, Mass. | 403 E. Franklin St., Richmond 19, Va. | 511 No. Charles St., Baltimore, Md. | 688 Field Avenue, Detroit, Mich.

Manufacturers and Installers of LARSON Preformed Waterproofing Units

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Over 800 Installations *Completed*

LARSON *SYSTEM OF WATERPROOFING*

PROTECTS

$750,000,000

INVESTED IN EDUCATIONAL BUILDINGS

Complete Protection from Foundation to Roof

Structural steel, pipes and conduits are completely sheathed. The entire perimeter of the window is flashed. The system begins at the top of the foundation wall and is sealed to the roof flashing.

Simple to Install

Our experienced waterproofers work side by side with bricklayers.

Consultation Service

The Company maintains a special consultation service for architects, superintendents of schools, and school boards.

The Test of Time

Recently a careful inspection of the earliest Larson installations was made, revealing that these buildings are still completely waterproof after more than fifteen years. The complete findings of this survey have been incorporated into a booklet which we will be glad to send you upon request.

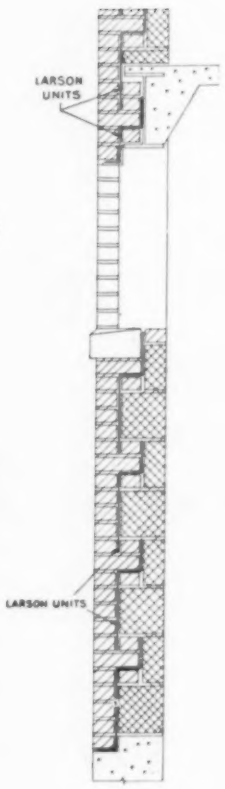
Guarantee

Ten-year Guarantee Certificate furnished with every LARSON installation.



TRADE MARK

Time-Tested



The LARSON System is a *guaranteed* waterproofing method that protects against leaks by means of a membrane built within exterior masonry walls.

Units have been designed to be easily and quickly laid in brickwork as it is built and to obtain a continuous barrier throughout the entire exterior wall area and around all openings for doors and windows.

Overlapping joints are completely sealed as they are laid. All corners are provided with carefully designed units that are locked with a standard wall unit at these vulnerable points.

Limited supply of Brisk A.I.A. file still available on request.



TRADE MARK

LARSON

PREVENTIVE WATERPROOFING FOR NEW CONSTRUCTION

CORRECTIVE WATERPROOFING FOR LEAKING BUILDINGS

building restoration

remedial waterproofing



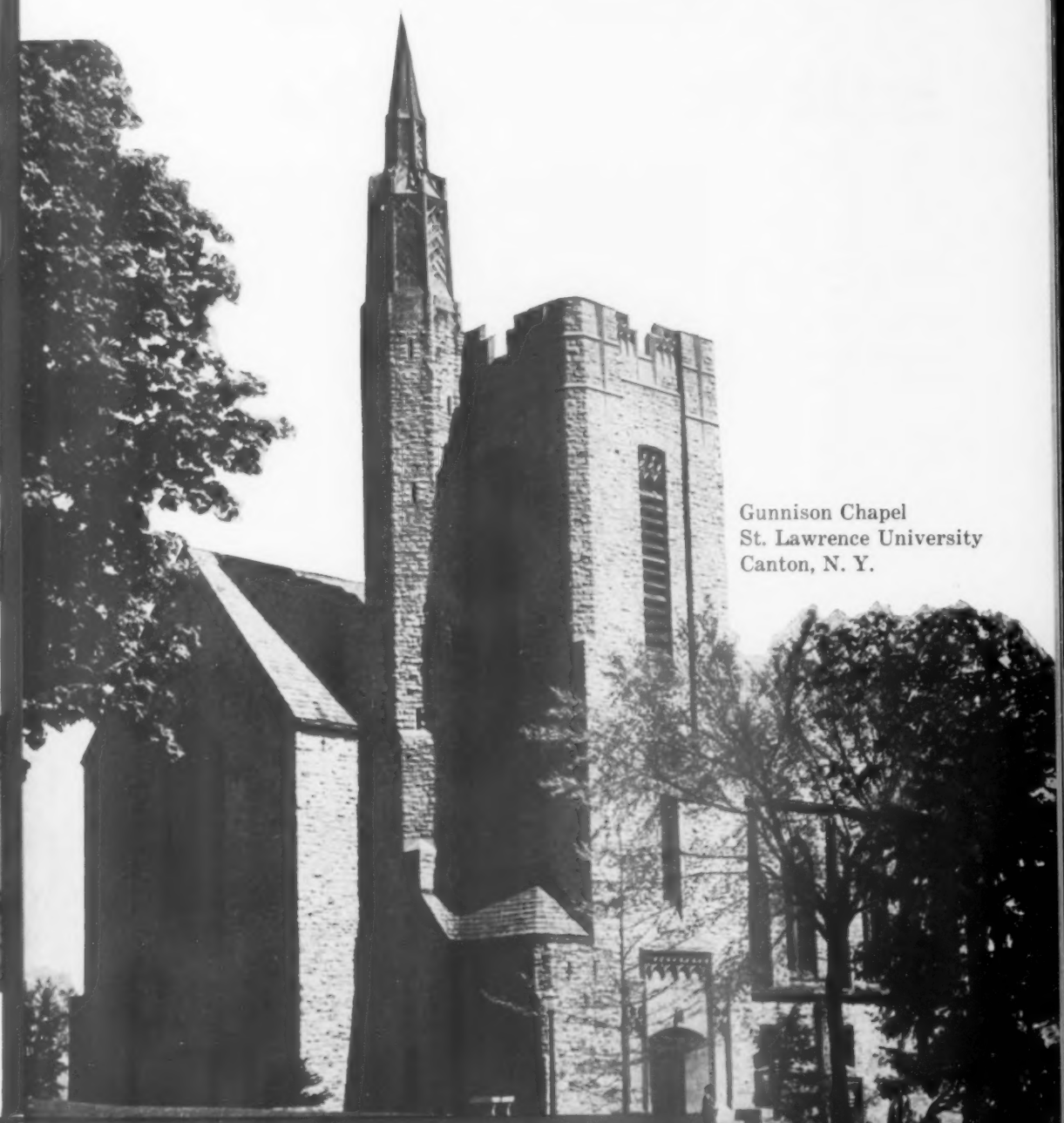
Massachusetts



Missouri



Texas



Gunnison Chapel
St. Lawrence University
Canton, N. Y.

CONTRACTING DIVISION
A. C. HORN CORPORATION

Main Office—10th Street & 44th Avenue
Long Island City 1, N. Y.
Subsidiary SUN CHEMICAL CORP.

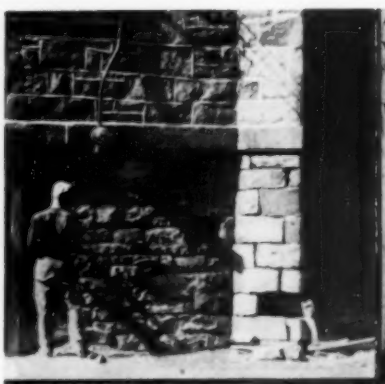


Brick masonry disintegration due to water-penetration through cracks and voids. **1**



2 *Open joints in limestone due to failure to repoint, permit further deterioration.*

is this the condition of your building?



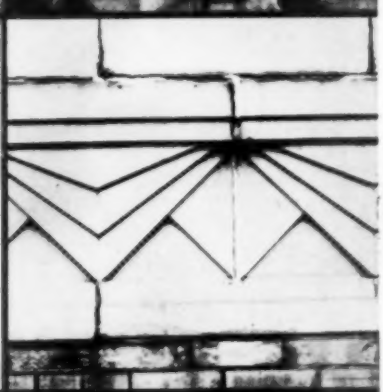
Random stone masonry disintegrated due to lack of proper maintenance. **3**



4 *Cast stone masonry in neglected condition. Restoration and pointing needed.*



Terra-cotta cornice disintegrated and spalled. In hazardous condition. **5**



6 *Terra-cotta trim and brick masonry disintegrated due to lack of pointing in time.*

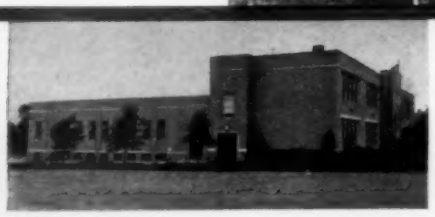


Valuable granite facing ruined by previous improper pointing methods. **7**



8 *Defective caulking allows entrance of moisture to ruin interior decoration.*

TYPICAL HORN JOBS



Ohio



Louisiana



Oklahoma



1 *Final treatment of brick masonry after Horn vibro-caisson grouting process.*



2 *Complete restoration of fine random stone masonry by skilled mechanics.*

horn methods we use to assure results



3 *Repointing prepared joints with J-O-I-N-T-E-X balanced repointing mortar.*



4 *Our skilled crews use modern equipment for restoration of stone masonry.*



5 *Mechanical saws used wherever possible, to obtain clean sharp lines.*



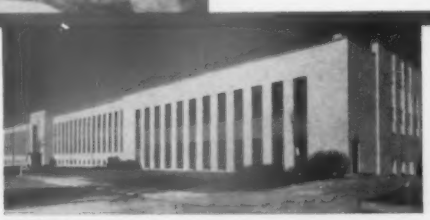
6 *Proper caulking is an important part of each waterproofing job we do.*



Rhode Island



Ohio



Minnesota

IN EVERY STATE



Massachusetts



Tennessee



Minnesota



Pennsylvania



Texas



Indiana

School and university jobs by HORN

other references on request

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REYNOLDS HALL, ALABAMA COLLEGE

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GEORGE SYKES SCHOOL
HOTCHKISS SCHOOL

DELAWARE
DELAWARE STATE COLLEGE
JOHN B. MOORE SCHOOL
SMYRNA HIGH SCHOOL

GEORGIA
GEORGIA TECH
UNIVERSITY OF GEORGIA
ROBERT E. LEE HIGH SCHOOL

ILLINOIS
GARFIELD SCHOOL
JEFFERSON GRADE SCHOOL
UNIVERSITY OF ILLINOIS

INDIANA
GREENSBURG SCHOOL
VALPARAISO UNIVERSITY

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WISCONSIN
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over 85,000,000 square feet treated

CONTRACTING DIVISION
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Subsidiary of SUN CHEMICAL CORPORATION

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Divisions of Sun include such old established names as Horn, Hudson, Willey (paints, building maintenance and construction materials, industrial coatings), Warwick (textile and industrial chemicals, waxes), Rutherford (printing presses and cameras), Sun Supply (supplies for lithographic industries), General Printing Ink (Sigmund Uilman, Fuchs & Lang, Eagle, American, Kelly, Chemical Color Supply (printing inks), Morrill (news inks) and Electro-Technical Products (coatings and reinforced plastics).

A1/2

THE THORO SYSTEM

WATERPLUG THOROSEAL QUICKSEAL



Masonry Protection Can Be Beautiful

Washington Junior High School,
Pontiac, Michigan.

Architect—William Zimmerman, Pontiac, Mich.
Contractor—Pontiac Building Cleaning, Pontiac, Mich.

THORITE patching on stone trim, THOROSEAL (Base Coat) and QUICKSEAL (Finish Coat) over all exterior stone. THOROCLEAR over entire masonry surface of brick and stone.

Inside, Outside and all around the school

Protection of masonry of schools has always been a major problem. Economical cost and ease of application place the THORO System products at the top of the list of preferred maintenance materials.

They are used for patching disintegrated or spalled concrete or stone; for sealing above- or below-grade masonry; for repointing leaking mortar joints and stone work; for decorating floors or walls above or below grade, interior or exterior.



VALLEY VIEW SCHOOL, CLEVELAND, OHIO

Economy in new school construction is obtained by using base coat of THOROSEAL and decorative finish of QUICKSEAL, over interior masonry surfaces, eliminating cost of conventional type of interior or exterior construction.

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA.

Write for our 16 page brochure, pictorially describing masonry problems, and specification writer's wall chart.



PRINTED IN U.S.A.

PHONES: MONONGAHELA 67 OR 1417

A. I. A. FILE NUMBERS 7-A-3, 7-B-1, 7-B-2, 3-B-2, 25-B-30, 25-B-26, 25-B-31



Inside, Outside—

General view of new dormitories Florida Southern College on banks of Lake Hollingsworth, Lakeland, Florida. All buildings THOROSEALED. Architect, Robert Law Weed, Miami, Florida.

Brandon School, Ortonville, Michigan

Contractor—Ward Ross, Pontiac, Mich.



Front of school—THOROCLEAR invisible water repellent, applied to all brick walls.

FRONT

REAR



Rear of school—All exterior block walls sealed with two coats of THOROSEAL.



Cora Bailey Grade School, Pontiac, Michigan.

Contractor—Pontiac Building Cleaning, Pontiac, Mich.

Reconditioning of entire exterior with one coat of THOROSEAL for base coat, one coat of QUICKSEAL for finish coat. Standard Dry Wall Products, Inc. materials approved by Pontiac Board of Education.



Whittier Junior High School, Pontiac, Michigan.

Architect—William Zimmerman, Pontiac, Mich.
Contractor—Chissus Construction Co., Birmingham, Mich.

Cinder block foundation coated with two coats of THOROSEAL FOUNDATION COATING. All brick and masonry trim sealed with THOROCLEAR.

Standard Dry Wall Products, Inc.

BOX X, NEW EAGLE, PENNSYLVANIA

Masonry Protection SINCE 1912

Since 1912, the name "The THORO System" has been the engineer's watchword for masonry protection. When masonry is subjected to weather conditions, disintegration invariably takes place. Surfaces of masonry, whether brick, stone or concrete, will slowly, but surely, deteriorate with constant wear from weather exposure.

The THORO System research staff maintains constant vigilance of new and better ways of preventing and correcting masonry problems. Still maintaining their original formula, and through trial and change, quality materials are produced at lowest reasonable cost.

Today, The THORO System products offer many kinds of masonry protection. **IF** masonry is cracked and water is pouring through, patch it instantly with WATERPLUG.

IF you want masonry walls kept dry, whether below grade or above, inside or out, use THOROSEAL masonry protective coating.

IF you want a colorful basement floor with maximum wearing qualities, use THOROLOK Blue Star Brand, rubber-base floor paint.

IF you want attractive asbestos shingles that will repel water, apply THOROLOK Red Star Brand, ranging from deep to pastel shades, and white.

IF you want to retain the beauty of both color and texture of exterior finish of your building, use THOROCLEAR, transparent water-repellent sealer.

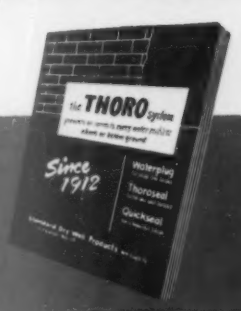
The THORO System products protect all masonry structures; see index of materials on following page.



Webster Grade School, Pontiac, Michigan

Contractor—Olsen Construction Co., East Detroit, Mich.
Approved by the Board of Education, Pontiac, Mich.

All brickwork, above roof, coated with two coats of THOROSEAL to eliminate pointing. All stonework and masonry trim were treated in same manner.



STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA.

Write for our 16 page brochure, pictorially describing masonry problems, and specification writer's wall chart.

The THORO System

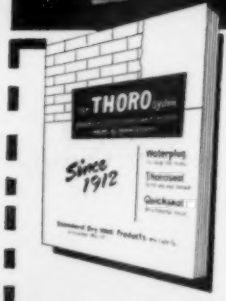
INDEX OF MATERIALS

TYPE	NAME	DESCRIPTION AND USE OF PRODUCT
Protective Wall Coatings and Surface Treatments	WATERPLUG	A quick-set hydraulic cement to stop streams of active water, grouting, filling and anchoring.
	THOROSEAL FOUNDATION COATING	A high type cementitious compound not subject to disintegration when exposed to ground waters. For exterior surfaces of foundations, bridge abutments, pits and all types of masonry below grade exposed to fills or earth embankments. Has exceptional structural strength.
	THOROSEAL, STANDARD GRAY, WHITE AND COLORS	A base coating to fill and seal masonry of all types and equalize the absorption of the various units comprising the surface; to make a more uniform finish of QUICKSEAL; for basement walls and every type of masonry which needs to be sealed.
	QUICKSEAL, SNOW WHITE AND COLORS	A finishing material of distinction and beauty, which, when applied over THOROSEAL base application, completes the sealing of surface; provides maximum decoration and long service.
Vapor Barrier and Plaster Bond	VABAR	A fine quality, cementitious material, prepared ready for use other than the addition of water. Applied to back-up walls of block, tile, brick or other type masonry. VaBar seals the surface and provides a proper bond for gypsum plaster.
Nonshrink Grouting Compound	THORITE	Twenty-minute set patching mortar, to fill holes and blisters in masonry surfaces; prevents further destruction of steel reinforcing. Ideal for scaffold work, as forming is unnecessary. No slump from edges of patch, nonshrink and nonmetallic.
Repairs and Patching Old Floors	BONDFAST PENETRATOR	Nonshrink bonding and penetrating Thorocrome compound for repairing and bonding new surfaces to old concrete. Repairing of floors and other masonry; one pound to each square yard.
Floor Hardener	P & W	A high quality concentrated chemical, formulated with laboratory exactness, packed for shipment in crystal form, to be dissolved in clean water. Adding additional water as directed, solutions are flushed over concrete surface by means of squeegee, mop or soft broom and produces a hard durable wearing surface, free of dusting and disintegration.
Integral Compound	THOROLITH	Eliminates excessive mixing water in concrete and mortar, increases density, checks capillarity and improves placability. A true Pozzuolanic nonshrink plasticizer.
Cement Paint	PEM	Beautiful coating for masonry walls. May be applied to any absorbent type masonry or concrete surface to cover stains, gives uniformity and change. Conforms to Federal Specifications TT-P-21. Type II, Class A.
Nonshrink Grouting Compound	THOROSET	A metallic compound for hardening mortars, grouting and bedding; accelerates strength and set.
Repointing and Grouting Mortars	DRYJOINT	A quality material for repointing all types of masonry, nonstaining for limestone, sandstone, etc. Prevents penetration of water, speeds placement and provides greater strength. Standard Gray or White and colors furnished upon request to match masonry.
	D-J MORTAR	A special mortar for grouting and sealing porous mortar joints on smooth type brick walls. Material is scrubbed into joints and over brick and then wiped off, leaving cracks in joints and brick sealed, retains normal brick appearance.
Transparent Sealer	THOROCLEAR	A high-quality product, prepared under exacting laboratory standards, to provide maximum water repellence, without changing appearance of any masonry. THOROCLEAR is invisible; it's water-repellent qualities prevent penetration of moisture into the surface.
Floor and Wall Coatings	THOROLOK BLUE STAR BRAND	A high quality rubber base floor sealer for maximum decoration and wear. Produced for thoroughly cured and dry concrete or masonry surfaces. Applied in two coats. Available in six attractive colors.
	THOROLOK RED STAR BRAND	A special high quality tung-oil base product, expressly designed for exterior coating of asbestos siding and shingles. May also be used over brick or tile, terra cotta, sandstone or limestone trim, interior plaster or wood trim. Applied in two coats. Available in six attractive pastel colors.



PREVENTION OF WATER PROBLEMS MORE IMPORTANT THAN CORRECTION

WESTLAKE SCHOOL
WESTLAKE, OHIO
Architect, Harry A. Fulton
Contractor, H. E. Klefmen Co.
Floors, walls and foundations protected with THOROSEAL.
Wall and floor angles protected with WATERPLUG.



Write for our 16 page brochure, pictorially describing masonry problems, and specification writer's wall chart.

WATERPLUG
Stops the leaks

THOROSEAL
Seals the surface

QUICKSEAL
For beautiful finish

Standard Dry Wall Products, Inc.
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WESTERN WATERPROOFING COMPANY, INC.

A Missouri Corporation And Its Affiliate
RESTORATION COMPANY, INC.

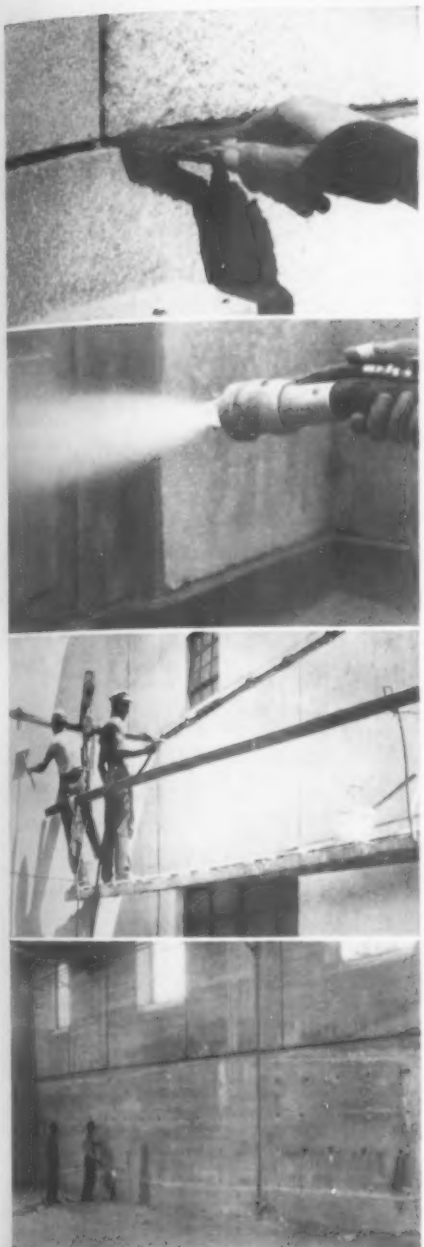
1223 Syndicate Trust Bldg., St. Louis 1, Missouri

Contractors and Engineers • Nationwide Service

STOP Water Damage...

Let WESTERN WATERPROOFING CO., Inc.

Weatherproof Your Buildings Now!



TUCKPOINTING

... with Dilato* Expanding Mortar. This treatment includes removal of all crumbling and deteriorating mortar and replacement with DILATO expanding mortar. Prevents moisture penetration beneath masonry surface, the first step in building decay cycle.

BUILDING CLEANING

... Western-developed Wet Aggregate* Process and other methods available, including steam, wet or dry sandblasting. Removal of grime deposits restores your building's original color and beauty.

CONCRETE RESTORATION

... with Resto-Crete* or gun-applied concrete. An above-ground treatment for deteriorating concrete, found principally on abutments, bleachers, gymnasiums, stadia and retaining walls.

SUB-SURFACE WATER PROTECTION

... with Ironite*, a metallic waterproofing material for surfaces in contact with earth. Protects basements, pools, underground passageways against hydrostatic heads.

All work done under contract, fully insured and guaranteed. No materials for sale.

Write for consultation, inspection and estimate.

ACCURATE METAL WEATHER STRIP CO., INC.

218 East 26th Street, New York 10, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES

Efficient Weatherstripping for all types of wood and metal windows and doors.

Various types and sizes of "ACCURATE" METAL WEATHER STRIPS places us in an ideal position to cooperate with school Architects and Executives in meeting their requirements.

TYPES AND QUALITY OF MATERIALS: Zinc and Bronze materials are ordinarily used depending upon atmospheric conditions.

THE COMPANY: The "ACCURATE" METAL WEATHER STRIP COMPANY has been manufacturing metal weather-strips for over 50 years and today it is outstanding in the industry.

MANUFACTURING FACILITIES: Owing to unusually efficient manufacturing facilities, personal supervision and complete control of every step in fabrication, purchasers of "ACCURATE" METAL WEATHER STRIPS are assured of prompt service and dependable workmanship.

ARCHITECTURAL SERVICE: Satisfactory results from weather strip depends upon three major factors:—(1) quality of equipment, (2) selection of equipment designed to meet the individual conditions and requirements, and (3) proper installation. Where time permits, we strongly urge that you permit us to submit complete and specific recommendations.

"ACCURATE" SERIES NO. 30 EQUIPMENT RECOMMENDED FOR SCHOOL WINDOWS

Heavy Double Hung School Windows Require Substantial Weather Strips

Large double hung windows such as those used in schools require a weather strip designed especially for this type and size of window. It is a waste of money to specify a light weight strip which is not designed for this type of heavy-duty service.

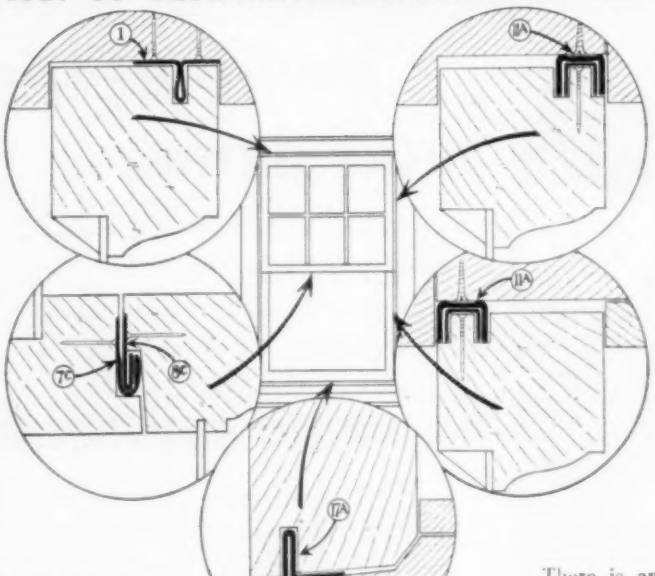
"Accurate" Series No. 30 Equipment

This series is designed especially for schools. It will stand up and take considerable abuse due to its shape and the heavy gauge metal used in its manufacture.

All parts of the equipment are precision made of heavy gauge special temper zinc or solid bronze as specified. It has a double metal to metal channel slide on the vertical edges of sash. The channel on the pulley stile is a heavy 16-gauge channel in which the sash channel slides. As the channels operate metal to metal, they have to operate perfectly as there is no chance for the mechanic to install them in any other way.

It will always hold its contact if applied with screws and not nails.

The narrow channel makes it possible to get to the sash weights easily. If it is necessary to remove the channel, it is rigid enough to hold its shape and can be replaced in the same position by using the same screw holes.



SERIES NO. 30 EQUIPMENT

For Other Types of Windows

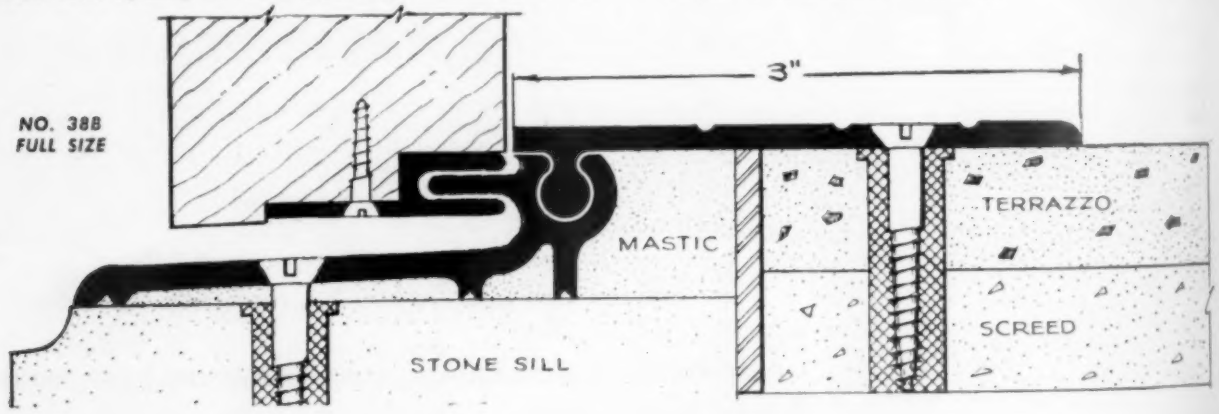
There is an "Accurate" weather strip for all types of wood or metal windows. If you have a problem, write to us for the proper weather strip for the condition.

ONE OF MANY TYPES OF "ACCURATE" EXTRUDED BRONZE SADDLES

"Accurate" also specializes in extruded bronze door saddles. Each saddle is designed for a specific condition and a saddle can be selected for practically any door condition.

"Accurate" No. 38B extruded bronze saddle is designed for exterior doors opening out. It is practically flush with the floor and its flat top surface does not interfere with the use of panic bolts. This saddle is also available in aluminum.

A complete series of saddles for use with exterior sliding doors will be found in our catalog in Sweet's. Availability of all metals subject to Government restrictions.



Now - A Brand New Writing Surface On Your Old Blackboard





2 — 24 Standard Green
2 — 20 Special Dark Green

FULLY APPLIED
3¢ per square foot

Here they are — the simple tools for easy quick application of Endur Green Resurfacer. Start right in without "hunting up" the essentials. Once over lightly with special sandpaper. No brush marks.

May be had with either 2-24 Standard or 2-20 Dark Green at 11.95 — an economy for you.

ENDUR 200 SERIES *Green Resurfacer*

Your time is valuable, both to you and the school. **You repeat many points** to your pupils each year. How many times? How many hours? Chalkboard Glare is the cause of a large amount of this waste of your time. Endur Green Resurfacer costs only 3c per sq. ft. fully applied.

When eyes wander — unrelated perceptions distract the student's mind. Chalkboard Glare is at work and it throws into unfavorable balance the correlation between student attention and student accomplishment. Possibly a thin thread of thought ... snaps.

Chalkboard Glare is an efficiency block, yes — but so easily overcome by Endur Green Resurfacer. A simple surface to paint, you will find your new, cool green chalkboard retains chalk bite throughout the normal life expectancy of 10 years.

FOR SLATE BLACKBOARDS
FOR COMPOSITION CHALKBOARDS
FOR ANY SMOOTH SURFACE



PRICE LIST:

Endur Green Resurfacer Kit	**$11.95**
1 gallon Endur Green Resurfacer	**9.30**
1 gallon Endur Black Resurfacer	**9.30**
1 quart Endur Green or Black Resurfacer	**2.50**
Rubber Set 4" nylon brush	**4.50**
Carborundum Sandpaper — 6 sheets	**.70**

The Endur SYSTEM For Modern Schools

PREPARING THE SURFACE



Clean surface of board. Remove all bits of paper and other foreign matter. Wash board with turpentine and let dry.

Mix Resurfacer thoroughly: Stir with flat paddle. Pour off half the contents of the can into another container and stir both halves vigorously. Continue stirring while pouring first half back into original container.

SMOOTHING AND CHALKING-IN

Permit final coat to dry 48 hours. Sand *lightly* using water with Carborundum Waterproof Sandpaper Red-I-Cut Grit 320. Sand small area at a time and sponge clean before proceeding.



When surface is dry after sanding, wipe it over with a clean dry cloth. Chalk surface with the flat side of a piece of white chalk. Remove chalk dust with an eraser or clean, dry cloth.

APPLICATION

Use a good quality, soft long bristle or Nylon brush (or spray gun). Avoid sags by not applying too heavy. Excessive brushing is not necessary, simply work right along.

Average boards will require 2 to 3 coats; old, pitted boards four coats. Each coat should be allowed to dry 24 hours before next application.



MISCELLANEOUS

USE OF SURFACE: For best results and longest possible use, it is recommended that Dustless, soft white chalk be used on Endur "200" Series surfaces.

MAINTENANCE: Occasionally, sponge surface with water then wipe dry IMMEDIATELY with clean dry cloth.

COVERAGE: About 250 square feet per gallon for complete three coat application.



ORDER FROM YOUR SCHOOL SUPPLIER

B INTERIOR FINISH

a. Flooring

The Jennison-Wright Corporation	**B a/1**
Kentile, Inc.	**B a/2**
Robbins Floor Products, Inc.	**B a/3**
Uvalde Rock Asphalt Company	**B a/4**
National Terrazzo & Tile Association	**B a/5**
Congoleum Nairn, Inc.	B 11
Loxit Systems, Inc.	B 12

b. Stair Treads

American Mason Safety Tread Co.	B 13
American Abrasive Metals Co.	B 14, 15
Melflex Products Co., Inc.	B 16
Wooster Products, Inc.	B 17

c. Wall Tile and Covering

Metropolitan Brick, Inc.	**B c/1**
United States Plywood Corporation	B 18
Natco Corporation	B 19
The Mosaic Tile Company	B 20, 21
United States Quarry Tile Co.	B 22

e. Acoustical Materials

Dant and Russell Sales Co.	**B e/1**
Johns-Manville	B 23-26
The Celotex Corporation	B 27
Loxit Systems, Inc.	B 28
Wood Conversion Company	B 29

g. Partitions

Horn Brothers Division	**B g/1**
New Castle Products, Inc.	**B g/3**
John T. Fairhurst Co., Inc.	B 30, 31
The Sanymetal Products Co., Inc.	B 32, 33
Wayne Iron Works	B 34, 35

h. Chalkboards, Corkboards and Metal Trim

Moduwall, Inc.	**B h/1**
Bangor Cork Co.	B 36
Claridge Products and Equipment, Inc.	B 37
Inland Steel Products Company	B 38
The Jecmen Company	B 39
Loxit Systems, Inc.	B 40
Pennsylvania Slate Producers Guild, Inc.	B 41
E. W. A. Rowles Co.	B 42

i. Doors

Cornell Iron Works, Inc.	B 43
United States Plywood Corporation	B 44, 45
The Kinnear Manufacturing Co.	B 46

j. Wardrobes

The Interior Steel Equipment Co.	B 47
Richards-Wilcox Mfg. Co.	B 48, 49
A. R. Nelson Company	B 50

k. Builders Hardware

The Oscar C. Rixson Co.	**B k/3**
Yale & Towne	**B k/4**
Glynn-Johnson Corporation	**B k/5**
Norton Door Closer Co.	B 51
Sargent & Greenleaf, Inc.	B 52, 53
Vonnegut Hardware Co., Von Duprin Division	B 54
The Stanley Works	B 55

m. Bronze Tablets

The Michaels Art Bronze Co., Inc.	B 56
Spencer Industries, Inc.	B 57
United States Bronze Sign Co., Inc.	B 58

B a/1

KREOLITE WOOD BLOCK FLOORS



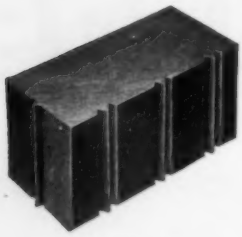
Quick to Install

Easy to Replace

THE JENNISON-WRIGHT CORPORATION • TOLEDO 1, OHIO

Kreolite Kountersunk Lug Blocks and Kreolite Grooved Blocks

• Recommended for general industrial service; for both heavy and light traffic.



Kountersunk Lug Type

The Kountersunk Lug Type, available in Yellow Pine and Upland Oak end grain blocks.



Grooved Block Type

The Grooved Block Type also available in Yellow Pine and Upland Oak end Grain Blocks.

Kreolite Kountersunk Lug Blocks are designed to meet all general conditions, wet, damp or dry, for both inside and outside service. The open joints permit free penetration of the filler and binder around all four sides of each block.

The grooved type is suitable for use under dry interior conditions.

Either type of block is available in End Grain Yellow Pine (Class I), or End Grain Upland Oak (Class II), the Upland Oak being recommended for use where extremely heavy traffic is encountered.

Class I and II blocks are impregnated under pressure with Kreolite Creosote oil.

The usual depth of the blocks varies from 2", 2½" and 3", but varies with the intensity of the traffic and should be determined by an experienced engineer.

SPECIFICATIONS • For K54, Class I and Class II Kountersunk Lug or Grooved Blocks

MANUFACTURE:

The blocks shall be the Kreolite Kountersunk Lug Type with two or three lugs on one side and one lug on one end of each block. The lugs shall protrude approximately $\frac{1}{16}$" from the side of each block. These lugs shall be an integral part of the wood, extending in the direction of the grain. Lugs shall protrude $\frac{1}{16}$" for interior dry conditions, ⅛" for interior wet conditions, $\frac{1}{16}$" for exterior platforms, driveways, etc.

They shall be 2", 2½" or 3" in depth, approximately 2¾" to 4" in width, and may vary from 4" to 8½" in length. A variation of $\frac{1}{16}$" shall be allowable in depth and ⅛" in width of blocks furnished.

They shall be manufactured from carefully selected Southern Yellow Pine and shall be treated with Kreolite Creosote Oil, in accordance with the modern Kreolite Pressure Process, leaving at least 6 lb. of oil per cubic foot of timber in the blocks.

Season checks shall not be considered defects.

They shall be manufactured by The Jennison-Wright Corporation and laid according to the following specifications, under the direction of the manufacturer's superintendent.

INSTALLATION:

The blocks shall be installed on a seasoned concrete base, which has been finished smooth and level (a smooth wood float finish will be satisfactory) exactly the depth below the finished floor level corresponding with the depth of the block used. Care must be taken to see that there are no projections, ridges or waves in the concrete that will form an uneven bearing for the blocks.

The concrete base shall be thoroughly cleaned of dust and dirt and given a prime coat of Kreolite Priming Oil. After the priming oil has dried, it shall be given a thin, even coating of hot Kreolite Pitch, not exceeding ⅛" in thickness. This coating shall be allowed to harden before laying the blocks.

Upon the base, as above prepared, the blocks shall be laid tightly together with the grain vertical. The courses of the blocks shall be kept straight and parallel and all joints shall be broken by a lap of at least one inch. In truckways and whenever possible, the blocks shall be laid with their length at right angles with the line of traffic.

Expansion Joints. Against the walls on all sides of the floor, as well as around all columns and other obstructions, a Kreolite Bituminous Expansion Joint one inch in width shall be used.

Filler. After the blocks have been laid in place and brought to a true and level surface, the surface of the blocks shall be flushed over carefully with Kreolite Pitch Filler, applied just below the boiling point, with a carefully manipulated squeegee machine. Care must be taken in its application to leave a clean surface.

After a period of at least two (2) hours, to allow the Kreolite Pitch Filler to cool and settle, a second application of filler, consisting of Kreolite Jennite, shall be flushed over the surface, without heating, and the surplus removed from the surface at time of application with a rubber edged hand squeegee. A period of at least eight hours shall be allowed for the Jennite to dry, after which the floor is ready for use. At completion, joints shall be filled uniformly to within approximately ¼" of surface.

NOTE: We do not recommend transverse expansion joints in the concrete base. If such joints are used the expansion joints must be left far enough below the surface of the concrete, so that when expansion of the concrete occurs, the expansion joint material will not be forced above the surface, and raise the blocks above the finished floor level.



The Pratt & Whitney Div., of Niles-Bement-Pond Co., West Hartford, Conn., over 887,000 sq. ft. of Kreolite Kountersunk Lug Wood Block Floors laid with Kreolite Pitch and Kreolite Jennite Filler. Architect—Albert Kahn, Detroit, Mich., Builder—Jas. Stewart & Co., Inc., New York.

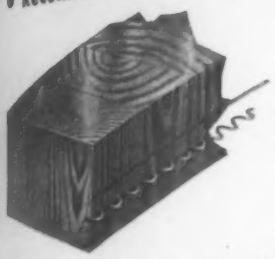


The Kaiser-Frazer Corp., Willow Run, Mich. Over 2,500,000 sq. ft. of Kreolite Kountersunk Lug Wood Block Floors with Kreolite Pitch and Kreolite Jennite Filler have been laid. Original building designed for Ford Bomber by Albert Kahn, Detroit, Mich.—Built by Bryant & Detwiler, Detroit, Mich.

Kreolite Flexible Strip End Grain Wood Block Floors, Class III

B a/1

• Recommended for high class industrial service, printing plants, schools, drill halls, gymnasiums, etc.



Flexible Strip End Grain Block
Showing the steel wire truss used to hold blocks together.

Designed to meet the demand for a light, natural color end grain wood block floor, and featuring a galvanized steel wire truss embedded in the side surfaces of the strips, forming a continuous type of flooring much more suitable than the loose block type for certain uses.

Impregnated with a colorless and odorless preservative that does not stain the wood, or with waterproof Kreolite Oil, if desired.

SPECIFICATIONS • For K54, Class III Flexible Strip End Grain Blocks

MANUFACTURE:
Kreolite End Grain *Flexible* Strip Wood Block Flooring shall be manufactured from kiln dried Southern Yellow Pine not over 2" x 4" in cross section, and assembled in *flexible* strips two feet to eight feet in length, ... inches in depth parallel to the grain of the wood and approximately 3½" in width.

Flexibility is essential in order to permit the strips to readily conform to the contour and deflections of the subbase: After manufacture, the strips shall be flexible enough to conform to the arc of a 17 foot diameter circle without injury to the blocks, or to the bonding trusses.

The strips shall show end grain only, on both the top and bottom surfaces.

The individual blocks shall be bonded into strips by galvanized steel wire trusses tightly embedded within their side surfaces at right angle to the grain, and milled for tight fitting, galvanized crimped steel wire splines.

The assembled strips shall be dressed square and true, to accurate, uniform dimensions on the wearing surface and two sides.

The assembled strips shall be impregnated at the plant with Kreolite moisture repellent Transparent Preservative to protect the material against absorption of moisture.

WATERPROOFING:
Where the strip flooring is to be installed on the ground floor or in basement, where water or moisture may seep through the concrete floor slabs, an approved waterproofing membrane shall be provided between the concrete slab and the blocks. The walls extending below the ground shall be properly waterproofed at time of construction by the building contractor.

INSTALLATION:
The interior of the building shall be dry and, if weather is cold, shall be heated before the flooring is installed.

The flooring shall be stored as long as possible in well ventilated piles in the building under actual conditions of heat and humidity, prior to installing.

The concrete base shall be solid, smooth, dry and clean and brought to a plane parallel to, and the exact depth of the Kreolite Strip Blocks, below the level of the finished floor.

After sweeping, the base shall be given a prime coat of Kreolite Priming Oil, followed, when dry, by a smooth, uniform coating of Kreolite Bituminous Cement.

The Kreolite End Grain Flexible Strip Block Flooring shall be laid over this coating with each strip interlocked to the adjoining strip by tight fitting, galvanized crimped steel wire splines, which overlap at least six inches across end joints.

Expansion joints one inch in width shall be formed around all columns and against all walls. These spaces shall be filled with Kreolite Expansion Joints.

The instructions of the manufacturer shall be followed when installing Kreolite Strip Block Flooring.

Conditions of temperature and humidity in the room must be proper for the application of the Finish.

FINISHING—For Industrial Use
After laying, the Kreolite Strip Flooring shall be sanded once over with an electric sanding machine and given two coats of Kreolite Penetrating Seal, applied 24 hours apart.

FINISHING—For Schools, Gymnasiums, Etc.
The surface of the floor, after installation, shall be sanded smooth with an electric sanding machine. Kreolite Filler shall then be carefully squeegeed over the surface and rubbed in, until all joints are completely filled; surplus filler shall be removed.

After at least twelve hours there shall be applied two coats of Kreolite Gymnasium Varnish, applied 24 hours apart. The floor shall be buffed between coats and polished or buffed after the final coat with an electric polishing machine.

Conditions of temperature and humidity in the room must be proper for the application of the finish. The finish shall not be applied until all other sub-contractors have left the room, and in no case under adverse weather conditions.

Additional finish coats of Kreolite Gymnasium Varnish may be applied, as wanted, at an additional cost.

The finished Kreolite End Grain Flexible Strip Block Floor shall then be protected from dirt and damage by covering with tarpaulins, sawdust or building paper until the building is ready to turn over to the Owner.

MAINTENANCE:
Kreolite Strip Block Floors should be cleaned and polished periodically, at least once every thirty days, with Kreolite Strip Wood Block Floor Cleaner, applied with a lamb's wool applicator and polished with an electric polishing machine.



The Olney School, Ross Township, Ohio. Kreolite Flexible Strip Block Floors were laid in the Auditorium, Stage, Lecture and Demonstration Rooms, Laboratories and Carpenter Shops.—Howard Manor, Grand Rapids, Ohio, Architect. James I. Barnes Construction Co., Dayton, Ohio, Contractor.



Kreolite End Grain Strip Wood Block Flooring in Composing Room. Chicago Tribune Tower Building, Chicago, Illinois. Over 75,000 square feet in this installation which includes mailing and file rooms, monotype and matrix sections, and shop areas.

Kreolite Jennite

• For Adding Life and Appearance to Old Block Floors

Kreolite Jennite is recommended for use as a final filler and finish for all Kreolite Class I and Class II wood block flooring construction. It is also recommended for use in the rejuvenation of old wood block floors, improving their service and appearance, as well as prolonging their life.

A coal tar product, Kreolite Jennite is an irreversible colloid with heavy closed ring hydrocarbon base, with water as the continuous phase. It is not affected by petroleum lubricants or other petroleum products. It is a coal tar pitch emulsion, which does not soften or become tacky under high temperatures.



Main Aisle—Stickney Ave. Plant, Electric Auto-Lite Co., Toledo, Ohio. Rejuvenated with Kreolite Jennite Mastic Filler.

Other Kreolite Products

- **Creosoted Timbers, Cross Ties, Piling**
- **Coal Tar Pitch • Coal Tar Products • Creosote Oil**

Kreolite Services Include

CHEMICAL DIVISION . . . For laboratory determination, and for development of improvements in timber treatment, treating processes and Kreolite products.

ENGINEERING DIVISION . . . For consultation and design of materials using products made or supplied by the Jennison-Wright Corporation.

SERVICE DIVISION . . . For installation of Kreolite Wood Block Floors on contract basis, or supervision of installation.

RESEARCH DIVISION . . . For periodical inspection of installations of Kreolite Wood Block Floors and other Kreolite products.

Specify **KREOLITE**

HOW WOOD BLOCKS SPEED PRODUCTION

1. **Quick to Install—Use Immediately After Laying**
2. **Easy to Replace in Sections—or by Units**
3. **Low Maintenance Cost***
4. **Low Tractive Resistance—Easy to Truck Over**
5. **Comfortable to Work Over**
6. **Dustless—Protect Bearings and Finished Product**
7. **Absorb Noise—Quiet**
8. **Lessen Vibration—Composed of Many Units**
9. **Resilient—Protect Dropped Tools and Parts**
10. **Insulate Against Heat and Cold**
11. **Spark-proof—Skid-proof—Safe****
12. **Firm Foundation for Machines**
13. **Durable—Withstand Heavy Abuse**
14. **Easy to Provide for Conduits or Cables**
15. **No Glare from Reflected Light—No Eye Strain Causing Increased Fatigue and Poor Work**

* Total repair costs over 20-year period under heavy duty have been reported as low as ½ of 1% of original investment.

** Kreolite Wood Block Floor is cleaner and safer (because skid-proof) when given a final coating of Kreolite Jennite, our new exclusive final filler and finish.

BRANCH OFFICES

ALBANY 5, NEW YORK
Geo. L. Dresser
P.O. Box 5052
Roessleville Branch
Phone—Albany-2-3359

ALLENTOWN, PA.
Morris Black & Sons
3rd and Union Streets
Phone—Hemlock 7201

BETHLEHEM, PA.
Morris Black & Sons
902-26 14th Ave.
Phone—University 7-4631

BIRMINGHAM, ALA.
Earl Glenn
700 6th Avenue N.
Phone—54-2547

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E. Howard Hutchinson
H. J. Kaswell
80 Federal Street
Phone—Liberty 2-8960

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A. H. Weaver Lumber Co.
715 Erie Co. Bank Bldg.
Phone—Cleveland 1031

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Edwin C. Bayette & Son, Inc.
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216 E. Morehead St.
Phone 6-2454

CHICAGO 1, ILLINOIS
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R. H. Pritchard
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Phone—State 2-1216

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Edward H. Peister and
Cincinnati Floor Co.
Eastern & Linwood Aves.
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Arthur D. Andrews
1737 Euclid Avenue
Phone—MAin 1-4000

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Building & Maintenance Co.
1863 Wazee Street
Phone—Keystone 2371

DETROIT 26, MICHIGAN
Bert Jones Jack Martin
880 Penobscot Bldg.
Phone—Woodward 1-2451

FORT WORTH 4, TEXAS
Chas. F. Williams Co., Inc.
328 Lipscomb Street
Phone 2-6363

GRANITE CITY, ILL.
H. M. Newton, J. E. Corrie
E. J. Littleton, Stanley Bell
St. Louis Exchange
Phone—Illinois 3114-3115

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1016 Baltimore Ave.
Phone—Baltimore 2630

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Daniel W. Thomson
Room 603
40 East 49th Street
Phone—Murray Hill 8-3345

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R. E. Copeland
P.O. Box 254
381 State Street
Phone—Chestnut 8-4479

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Trustin-Carlson Associates, Inc.
910 S. Saddle Creek Rd.
Phone—Glendale 8122

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F. W. Weir Fred Klippel
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Phone—Rittenhouse 6-8469

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Haldeman-Langford
2580 University Ave.
Phone—Nestor 6139

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317 State Tower Bldg.
Phone—Syracuse 2-9502

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The Kennedy Lumber Co.
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Phone—2-3151

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Production Service Assn.
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WESTERN DISTRIBUTOR
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KENTILE, INC.

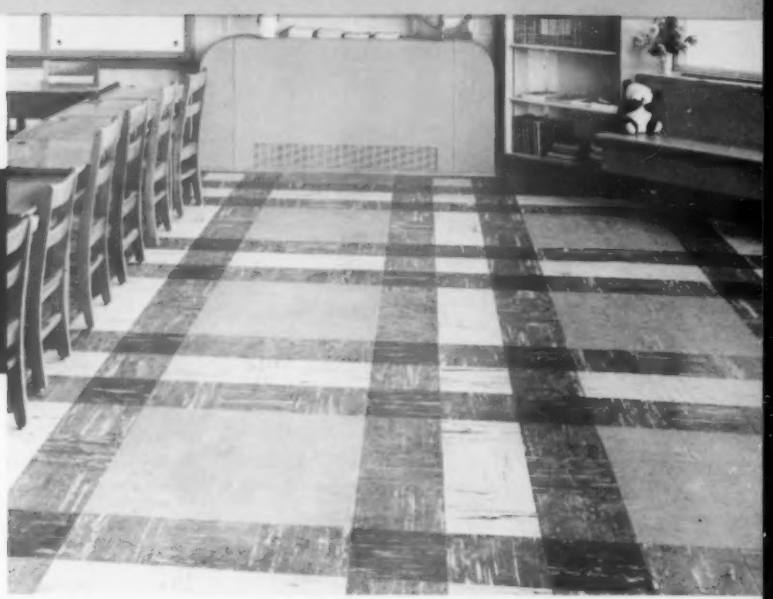
B a/2

FLOORS AND WALLS FOR SCHOOLS

A.I.A. File No. 23-G

KENTILE®

The Asphalt Tile of Enduring Beauty



For low-cost durability

Kentile is a thermoplastic tile made from asbestos fibers, coumerone-indene resins, plasticizers and selected color pigments. Each die-cut tile is tough, durable and easy to clean...with precision-straight edges and truer corners for ease and economy of installation. (Kentile can also be specified as a low-cost, long-lasting wall covering.)

ADVANTAGES:

Kentile can be installed over any smooth, firm interior, sub-floor that is clean, dry, and free of foreign matter ...even over concrete in contact with the earth—on or below grade. Because the tile-by-tile installation is so rapid, labor costs are held to a minimum... and the floor is immediately ready for traffic. Maintenance consists only of mild soap and water cleanings plus an occasional application of self-polishing floor wax. Further, the light, bright colors can't wear off under hard use or repeated cleanings... they go clear through to the back of the tile.

SPECIFICATIONS:

Kentile is available in four (4) color groupings; A, B, C and D. Group A contains the darkest colors... Group D the lightest colors. Standard tile size is 9" x 9"... thicknesses are 1/8" or 3/16". Border sheets of 18" x 24" are available in a limited number of colors for cutting to appropriate widths.

DECORATIVE AND FUNCTIONAL DESIGN:

The 24 Kentile colors range from light to dark and are available in both solid shades and with Kentile's preferred straight-line marbleization. This extensive and varied selection permits virtually any flooring design conceivable. In addition, decorative ThemeTile (9" x 9") and KenSerts (18" x 18") are available in a wide choice of pictorial subjects, letters, punctuation and numerals... as well as ready-to-install athletic courts. Feature Strips come in Standard Size of 1" x 24". Special sizes also available. Colors are: Black, Aspen Green, White, Cardinal Red and Yellow.

SPECIAL (greaseproof) KENTILE:

Special Kentile is a greaseproof asphalt tile for use where floors are constantly exposed to the deteriorating action of cooking or petroleum greases and oils. Special Kentile resists these agents and also is highly resistant to alcohols, alkalis and most acid solutions.

SPECIFICATIONS:

Special Kentile is available in standard 9" x 9" tiles. 18" x 24" border sheets in black only. Thicknesses are 1/8" and, where extra heavy duty flooring is required, 3/16". There are seven (7) Standard colors and four (4) De Luxe colors.

APPROXIMATE INSTALLED PRICES:

Cost based on installing a minimum area of 1,000 sq. ft. over cement underfloor:

	1/8" thickness	3/16"
KENTILE A Colors	20¢	25¢
KENTILE B Colors	25¢	30¢
KENTILE C Colors	30¢	40¢
KENTILE D Colors	35¢	40¢
SPECIAL KENTILE	40¢	50¢

Copyright 1954 Kentile, Inc., Brooklyn 15, N. Y.



KENRUBBER
TILE FLOORS ®

For extra quiet and comfort

High grade synthetic rubber, carefully compounded with other agents, produces floor tiles of precise squareness and gauge in a wide range of clear, fresh colors... all with built-in firmness and resiliency. Of all the resilient floor tiles, KenRubber rates first in properties which assure quietness underfoot combined with custom design effects and long service.

ADVANTAGES:

In corridors, classrooms or special purpose rooms KenRubber muffles the din of congested foot traffic. It is a restful flooring, reducing fatigue and encouraging concentration during study hours. KenRubber's toughness insures years of service. An occasional mopping keeps KenRubber clean and bright—self-polishing wax, applied as needed, preserves its mirror-like finish.

SPECIFICATIONS:

KenRubber colors are divided into two groups: Regular and Special. Special colors contain lighter pigments—hence they comprise the brighter tones. Equal in quality but of medium and darker tones are the Regular colors. Standard sizes are 6″ x 6″ and 9″ x 9″. Thicknesses are Standard Gauge (.080″), 1/8″ and 3/16″. KenRubber can be installed over any smooth interior, firm underfloor which is clean, dry and free of foreign matter. For installation over concrete on grade, KenSet adhesive must be used. Do not install KenRubber on floors below grade unless membrane waterproofed.

DECORATIVE AND FUNCTIONAL DESIGN:

KenRubber colors are new, modern colors... providing the light, bright beauty considered so important in today's design. And, because the selection is so wide with marbleized colors ranging from deep, clear dark colors to crisp, clean light tones, it is an easy matter to plan and execute any flooring design desired. Further, KenRubber is the only rubber tile available that offers the added feature of decorative ThemeTile (9″ x 9″). Black, White, Green, Antique Red and Canary Feature Strips come in Standard Size of 1″ x 36″. Special sizes also available. Alphabet letters, punctuation and numerals are also available.

APPROXIMATE INSTALLED PRICES:

Cost based on installing a minimum area of 1,000 sq. ft. over cement underfloor:

	Standard Gauge (.080″)	1/8″ thickness	3/16″ thickness
KENRUBBER	50¢	65¢	80¢

KENFLEX
VINYL TILE ®

Defies grease, dirt and wear

KenFlex is a resilient flooring made from asbestos fibers, vinyl resins, plasticizers and selected color pigments. It is one of the most durable floorings known...and one of the easiest to clean. In fact, test installations have shown that millions of people walking over KenFlex for more than a decade can not harm its surface or affect its appearance in any manner.

ADVANTAGES:

KenFlex can be installed over any smooth interior surface that is clean, dry and free of foreign matter...even over concrete in contact with the earth—on or below grade. KenFlex is impervious to greases, oils, dirt and stain. Spilled inks, dyes, alcohols and alkalis can't affect it. KenFlex resists traffic wear, scrapes and scuffs. Yet, it cleans with just a damp cloth...never needs waxing unless you wish to make the brilliant colors shine a bit more.

SPECIFICATIONS:

KenFlex is available in 15 marbleized, co-ordinated colors. The standard tile size is 9" x 9"...thicknesses are Standard Gauge for most normal uses and 1/8" for extra-heavy duty.

DECORATIVE AND FUNCTIONAL DESIGNS:

KenFlex colors, because of their vinyl composition, have a soft yet crisp brightness, particularly suitable for the modern school. Further, KenFlex is the only vinyl tile available that offers the added advantage of decorative ThemeTile (9" x 9") and KenSerts (18" x 18") to liven and individualize any area. Alphabet letters, punctuation and numerals are also available. Feature Strips come in Standard Size of 1" x 24".Colors are: White, Green, Red and Yellow.

Ready-to-install athletic courts are also available.

APPROXIMATE INSTALLED PRICES:

Cost based on installing a minimum area of 1,000 sq. ft. over cement underfloor:

	Standard Gauge	1/8" Thickness
KENFLEX	40¢	65¢



KENCORK®
FLOORS WALLS



For quiet dignity

Kencork is all pure cork...compressed under scientifically controlled heat and pressure to a fraction of its original bulk. No artificial binders or coloring agents are used and the resultant tile is outstanding for the beauty and subtilty of its random shadings...its amazing ability to mellow rather than deteriorate with age, hard use and repeated cleanings.

ADVANTAGES:

Kencork can be installed over any smooth, dry interior surface...even over concrete in contact with the earth if drainage is away from the installation and the concrete slab is at least 12" above the surrounding fill. Kencork can be rapidly and economically installed...maintained with a minimum of effort and expense. The durability of this material is unquestioned...installations over 50 years old still look and feel like new. Other advantages of Kencork are its ability to shed moisture—its quiet, comfort and safety underfoot—its insulating properties that help keep rooms warmer in winter and cooler in summer. Many architects find Kencork the perfect answer to floor requirements in libraries, conference rooms, offices and as a wainscoting in therapy rooms.

SPECIFICATIONS:

Kencork is available in random tones. No shade is too dark . . . none too light . . . in factory or natural finish. The standard floor tile sizes are 6" x 6", 6" x 12", 9" x 9", 3" x 18", 12" x 12" and 12" x 24" . . . wall tiles available in same sizes. Thicknesses available are 3/16" and 5/16".

APPROXIMATE INSTALLED PRICES:

Cost based on installing a minimum area of 1,000 sq. ft. over cement underfloor:

	3/16" thickness	5/16" thickness
KENCORK factory or natural finish	60¢	70¢

COVE BASE

KENBASE seals the gap where floors and walls meet . . . aids cleanliness and economy . . . never needs painting and never shows mop or scuff marks.

KENCOVE is the new all-purpose, flexible wall base . . . grease and alkali proof . . . won't break, crack or chip.

APPROXIMATE INSTALLED PRICES of Kentile, Inc. Cove Base.

	Varies with color selected	Colors
4" KenBase	31¢ — 36¢ per lin. ft.	Black, Quarry Red, Green, Tan, Grand Antique and Sarrancolin
6" KenBase	36¢ — 41½¢ per lin. ft.	
4" KenCove	38¢ — 44¢ per lin. ft.	Black, Green, Red and Brown

KENTILE, INC. SUNDRIES GIVE MAXIMUM MAINTENANCE EFFICIENCY AND ECONOMY

The cleaners, waxes and protectors described below have been specially formulated by Kentile, Inc. for resilient tile flooring of all kinds and makes. Their use will add life and beauty to your flooring...at a minimum cost.

KEN-CLEANER is a mild cleaner for all resilient flooring. It contains no harsh alkalis or mineral spirit solvent to soften or otherwise harm resilient tiles.



KENGRIP WAX is a superior no-rub, self-polishing floor wax with colloidal silica in solution. It provides a high gloss to floors and, at the same time, reduces the hazards of skidding and slipping.



KENWAX is a self-polishing, no-rub floor wax with an extremely high Carnauba content. It gives a high, lasting luster with a minimum of time and effort.



KENCORK WAX is a superior quality paste wax for cork flooring. It can be applied by hand or machine and serves to provide maximum luster and protection.



KENTILE CASTERS AND GLIDES are designed to spread the weight of furniture evenly over a broader surface. Their small cost is many times paid back in extra life for any floor or floor covering.



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ROBBINS

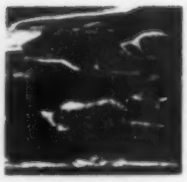
Lifetime Floors



- Lifetime® Vinyl Tile
- Lifetime® Vinyl Terra-Tile
- Lifetime® Vinyl All-Purpose Terra-Tile
- Rubber Tile
- Rubber Terra-Tile
- Lifetime® Vinyl Cove Base & Corners
- Rubber Cove Base & Corners
- Lifetime® Vinyl Safety Tread Runner
- Lifetime® Vinyl Stair Treads
- Adhesives

FOR BUILDERS AND ARCHITECTS

Who Demand the Best!



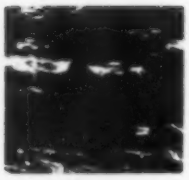
95 Gulf Blue



65 Medium Mixed Gray



74 Shamrock Green

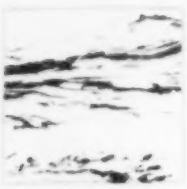


35 Ruby Red

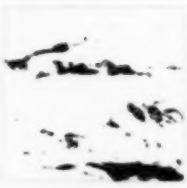
80 Canary Yellow



32 Fleetw Blue



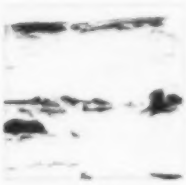
59 Azure Blue and White



51 Jet Black & White



56 Emerald Green and White



53 Ruby Red & White



78 Chartreuse



34 Walnut



34 Copper & White



15 Black Marble



42 Golden Oak



85 Buckskin



36 Coral

Solid Colors
Black • Brow
Terra Cotta • I
Tan • Gre
White • Gre
Yellow • Blu

ROBBINS *Lifetime*® VINYL TILE

The quiet comfort and functional beauty of Robbins Lifetime Vinyl Tile makes it the ideal flooring for homes, public buildings and industrial installations. Whether the vivid, tile-thick solid colors or the glamorous marbleized patterns of Lifetime Vinyl Tile, the accent is on beauty and serviceability—*for a lifetime.* Robbins Lifetime Vinyl Tile is a maintenance miracle. *It needs no waxing . . . ever!* The satin molded finish resists strong cleansers, alkalies, acids, grease, fats and oils. Occasional mopping and buffing preserves its polished lustre. Lifetime Vinyl Tile is resistant to attack by any type wax and where extreme high lustre is desired occasional very light applications of high resinous wax can be used to speed up buffing. It cushions footsteps . . . muffles noise.

Installation is fast and fool-proof. Each Lifetime Vinyl Tile is precision squared for perfect fit by an exclusive Robbins process. It can be installed over any type sub-floor, including concrete which is not in direct contact with the earth or below grade. (Note: It may be installed over concrete on grade or below grade provided a waterproof membrane is installed under the slab.)

COLORS

Available in the 17 marbleized patterns shown above and 10 solid colors. Lifetime Vinyl Tile is also available in six beautiful decorators colors—Coral, Beige, Ivory, Gray, Sand and Blue—in solid colors, marbleized patterns and terrazzo.



SIZES

Standard thicknesses:	1/8" (3/32" or 3/16" available special order).
Standard sizes:	6" x 6", 9" x 9", 12" x 12". (Other sizes available on special order up to 36" x 36").

FEATURES AND BORDERS

Features and borders are available in the same colors of Robbins Lifetime Vinyl Tile, including solid colors, in the following sizes:

Feature Strips

Standard thicknesses:	1/8" (3/32" or 3/16" available special order).
Widths:	1", 1½".
Lengths:	3 ft.

Borders

Standard thicknesses:	1/8" (3/32" or 3/16" available special order).
Maximum sizes:	3 ft. x 3 ft.

B A/3

ROBBINS LIFETIME® VINYL *Terra-Tile*

The incomparable beauty of italian terrazzo reproduced in restful, resilient Lifetime Vinyl makes Robbins Lifetime Vinyl Terra-Tile the most outstanding combination of beauty, long wear and low maintenance to be found. Robbins Lifetime Vinyl Terra-Tile withstands heavy wear and tear for a lifetime and stubbornly resists scuff marks and furniture indentations. The beautiful designs are tile thick—cannot wear off.

Robbins Lifetime Vinyl Terra-Tile is precision squared for perfect fit; leaves no unsightly cracks to trap dirt and mar appearance. Absolute uniformity of color and patterns makes possible solid, one-piece effects. It can be installed over any type sub-floor, including concrete which is not directly in contact with the earth or below grade. (Note: However, it may be installed over concrete on grade or below grade provided a waterproof membrane is installed under the slab.)

Lifetime Vinyl Terra-Tile *needs no waxing . . . ever!* Occasional mopping and buffing preserves the original beauty. The stain molded finish is highly resistant to greases, oils, strong cleansers, fats, acids and alkalies. Iodine and fruit stains are easily wiped up. It is highly resistant to attack by any type wax and where extreme high lustre is desired occasional very light applications of high resinous wax can be used to speed up buffing.

COLORS

Available in 16 terrazzo patterns shown below, and in six beautiful pastel decorators colors—Coral, Beige, Ivory, Gray, Sand and Blue.

SIZES

Standard thicknesses: 1/8".
Standard sizes: 6" x 6", 9" x 9", 12" x 12".
(Other sizes available on special order up to 36" x 36".

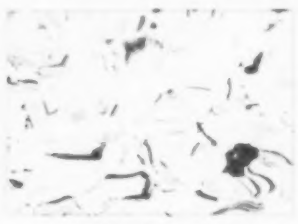
FEATURES AND BORDERS

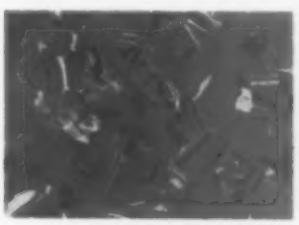
Features and Borders are available in the same colors and designs as Lifetime Vinyl Terra-Tile or in solid colors.

Feature Strips

Standard thicknesses: 1/8".
Widths: 1", 1½".
Lengths: 3 ft. x 3 ft.

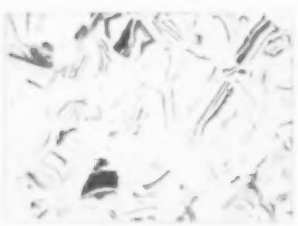

TV-95 Blue Crush

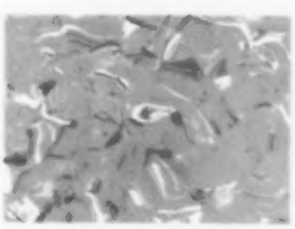

TV-59 Blue Frost


TV-32 Aztec Red

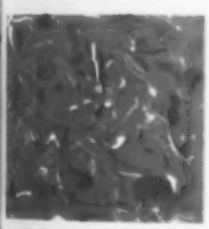

TV-15 Ebony Etch

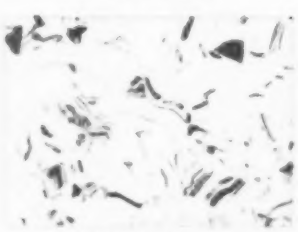

TV-35 Riviera Rose


TV-53 Red Frost


TV-42 Sandy Buff

TV-80 Buttercup

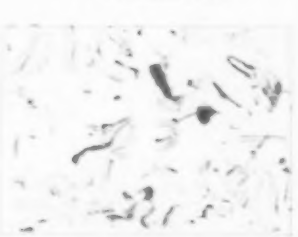

TV-65 Medium Gray Crystal


TV-51 Black Frost


TV-36 Coral Gold


TV-34 Copper Chip


TV-74 Frosted Jade


TV-56 Green Frost


TV-24 Harvest Brown


TV-85 Doeskin



ROBBINS all purpose

(Patent Pending)

LIFETIME® VINYL

Terra-Tile

The Tile That Needs No Adhesive!

For the first time in the history of resilient flooring it is possible to lay tile on below grade areas, where moisture is excessive, without fear of failure. Alkali and moisture oozing through concrete attack and eventually destroy adhesives used with conventional tile, causing seepage through the joints. The exclusive and revolutionary construction design of Robbins All-purpose Terra-Tile, however, completely overcomes this problem. *No adhesive is used in the installation of this tile!* The absolute dimensional stability, perfect squaring and the unique "honeycomb" construction of the tile back eliminates the possibility of moisture being forced out through the joints. Unlike many flooring materials, Robbins All-Purpose Terra-Tile is completely unaffected by water or alkalies. It will not absorb moisture; will not swell or curl. It does not deteriorate when subject to chemical attack and is, therefore, ideal for use where such conditions are prevalent.

With All-Purpose Terra-Tile, shifting of wood sub-floors due to expansion and contraction is no longer a problem. No expensive underlays are necessary and no special preparation of sub-floors is needed. Because of its unique construction, All-Purpose Terra-Tile is twice as thick as ordinary tile and offers up to 10 times the resilience of ordinary tile. Despite this extra thickness, however, it is not a laminated, sandwich type flooring—*the brilliant terrazzo design is tile thick!* The added thickness and honeycomb back also gives superior wearing qualities, added resistance to indentation and provides an effective insulating layer between floor and tile.

All-Purpose Terra-Tile is highly resistant to greases, oils, fats, acids, alkalies, and harsh cleansers. It may be kept spotlessly clean with occasional mopping and buffing. It *needs no waxing . . . ever!* It is resistant to attack by any type wax and where extreme high lustre is desired occasional very light applications of high resinous wax can be used to speed up buffing.





SIZES

Standard thickness: 1/4".
Standard sizes: 9" x 9", 12" x 12".

COLORS

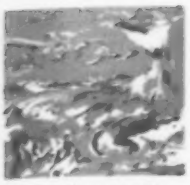
Available in the 16 beautiful terrazzo patterns shown on pa for Robbins Lifetime Vinyl Terra-Tile.

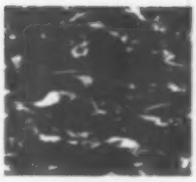
FEATURES AND BORDERS

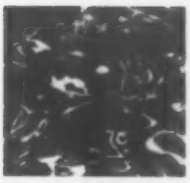
Features and Borders are cut from tiles to the widths desir

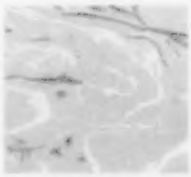
B A/3

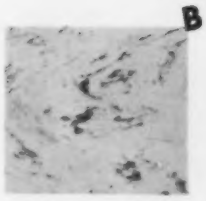

968 Blue-White


545 3 Tone Medium Gray

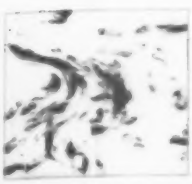

755 Green-White

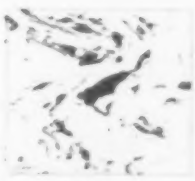

362 Red-White

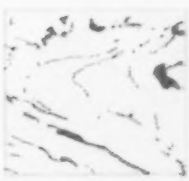

845 Yellow-White


425 Cream-Pink-Dark Brown


592 White-Blue


575 White-Black

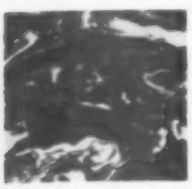

572 White-Green

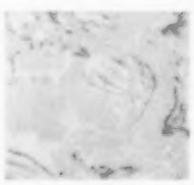

552 White-Red

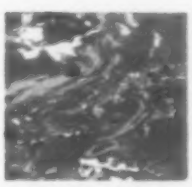

265 Maroon-Gold


355 Terra Cotta-White


125 Black-White


235 Brown-Cream-Dark Brown


435 Cream-Buff-Tan


885 Sand-Pink-Light Gray-Dark Gray


785 Chartreuse-White

Solid Colors

Black • Brown
Terra Cotta • Red
Tan • Gray
White • Green
Yellow • Blue

ROBBINS Rubber Tile

Whether the need is for a bold and striking design, or an air of serenity and dignity, Robbins Rubber Tile will meet the requirements exactly. With the wide range of beautiful solid colors and marbleized patterns, there is virtually no limit to the effects that can be achieved through combinations of Robbins Rubber Tile. It is the ideal choice for installations where beauty, comfort and economy are the requisites.

Robbins Rubber Tile is designed to give a lifetime of service even under the heavy traffic of busy public buildings. Perfect fidelity of color tone and pattern is maintained through the entire thickness of the tile. Molded under pressure, it provides a firm-yet-resilient floor which cushions footsteps and provides new walking comfort and sound-absorbing qualities.

Each tile is precision cut to absolute four-square perfection, allowing fast and economical installation with no unsightly dirt-catching crevices between tiles. It can be installed over any type of sub-floor, including concrete which is not in direct contact with the earth or below grade. (Note: It may be installed over concrete on grade or below grade provided a waterproof membrane is installed under the slab.) Robbins Rubber Tile is easily maintained—an occasional mopping, waxing and buffing is all that is necessary to retain the beauty and brilliance of a new floor.

SIZES

Standard thicknesses: 1/8" (3/32" or 3/16" available on special order).

Standard sizes: 6" x 6", 9" x 9", 12" x 12".
(Other sizes available on special order up to 36" x 36").

COLORS

Available in the 17 marbleized patterns shown above and in 10 rich solid colors.

FEATURES AND BORDERS

Feature Strip

Standard thicknesses: 1/8" (3/32" or 3/16" available on special order).

Standard widths: 1", 1½".

Border

Standard thicknesses: 1/8" (3/32" or 3/16" available on special order).

Maximum size: 3 ft. x 3 ft.



ROBBINS Rubber TERRA-TILE

Robbins Rubber Terra-Tile marks a really new advance in floor styling. It offers the rich coloring and polished brilliance of marble terrazzo while retaining all the features—the resilience, the comfort, quiet and easy maintenance—that have made rubber a preferred flooring material for homes, institutions and business houses. Available in a wide range of colors, Terra-Tile opens a striking new field for design. It makes possible terrazzo-like floors in any place, over any sub-floor surface, where standard rubber tile can be installed, including concrete which is not in direct contact with the earth or below grade. (Note: It may be installed over concrete on grade or below grade provided a waterproof membrane is installed under the slab.) It is not limited by special conditions, such as dimensional and weight factors in modernization, that preclude the use of terrazzo.

The unique production process by which Terra-Tile is produced assures uniform coloration in all tiles, permitting solid-design floors without noticeable joints. It possesses the same dimensional perfection of all Robbins floor tiles. Absolute squareness of corners and edges and uniformity of thickness makes Robbins Rubber Terra-Tile easy, fast and economical to lay.

SIZES

Standard thicknesses: 1/8", 3/16".
Standard sizes: 6" x 6", 9" x 9".

COLORS

Available in the 14 terrazzo designs shown at right.

FEATURES AND BORDERS

Features and Borders are available in the following solid colors only:

Style No. 100	Black	Style No. 500	White
Style No. 200	Brown	Style No. 510	Gray
Style No. 310	Red	Style No. 700	Green
Style No. 350	Terra Cotta	Style No. 800	Yellow
Style No. 400	Tan	Style No. 900	Blue

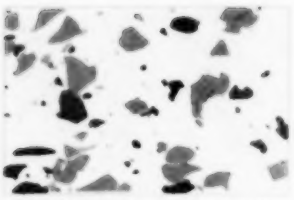
Note: The unique pattern of Terra-Tile allows Features and Borders to be cut from 9" x 9" tiles to form continuous strip effect.

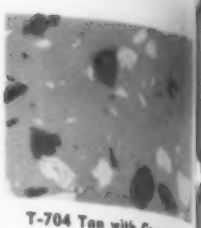
Feature Strip

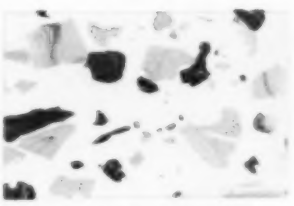
Standard thicknesses: 1/8" (3/16" available on special order).
Standard widths: 1", 1½".

Border

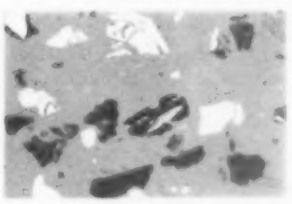
Standard thicknesses: 1/8" (3/16" available on special order).
Maximum size: 3 ft. x 3 ft.

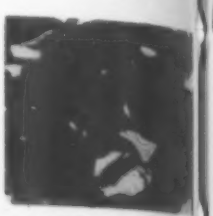

T-705 White with Gray and Black

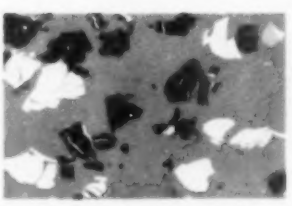

T-704 Tan with Cream and Maroon

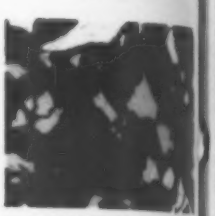

T-715 White Cream and Maroon


T-708 Salmon with Brown and Tan


T-707 Green with Dark Green and White


T-702 Dark Brown with Tan and Black


T-709 Blue with Dark Blue and White


T-718 Black with Yellow and White


T-725 Slate with Black and Medium Gray


T-717 Black with Green and White


T-703 Light Red with Red and White


T-706 Gray with Black and White

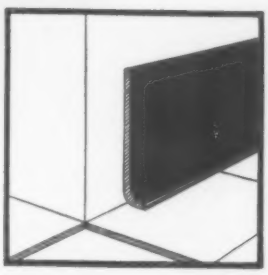
T-701 Black with White and Gray

T-770 Dark Green with Black and Light Green

ROBBINS

Lifetime® Vinyl and Rubber Cove Base

The most complete line of rubber and vinyl cove in the world today!





The perfect finishing touch for every floor, Robbins Lifetime Vinyl or Rubber Cove Base offer the ideal combination of beauty and utility. The streamlined, wall-hugging contour unites floor and wall with a tight, sanitary seal that makes cleaning easy. Lifetime Vinyl Cove and Rubber Cove, with matching inside and outside corners, are available in a wide range of beautiful solid colors in both set-on and toe-type. Lifetime Vinyl Cove is also made in 8 vivid pearlized and oak-grain patterns and in hi-lustre jet-black which make any installation outstanding.

COLORS

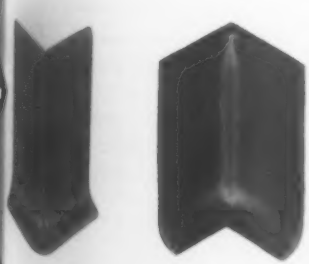
Lifetime Vinyl and Rubber Cove are available in the 9 solid colors shown at right.

Lifetime Vinyl Flex-Cove is available in the 5 pearlized and 4 oak-grain patterns shown at right plus jet-black hi-lustre.

SIZES

Lifetime Vinyl and Rubber Cove in solid colors are available in 1½", 4" and 6" wall heights, 1/8" wall, set-on type, and in 4" and 6" wall heights, toe-type, for use with 3/16" tile. Lifetime Vinyl Cove may be had in 3 ft. and 4 ft. lengths and 120 ft. rolls. Rubber Cove is made in 3 ft. and 4 ft. lengths. Inside and outside corners in 4" and 6" wall heights are available for set-on type only.

Lifetime Vinyl Flex-Cove in both pearlized and oak-grain patterns is available in 4" and 6" wall heights, set-on type only, in lengths of 3 ft. and 4 ft.

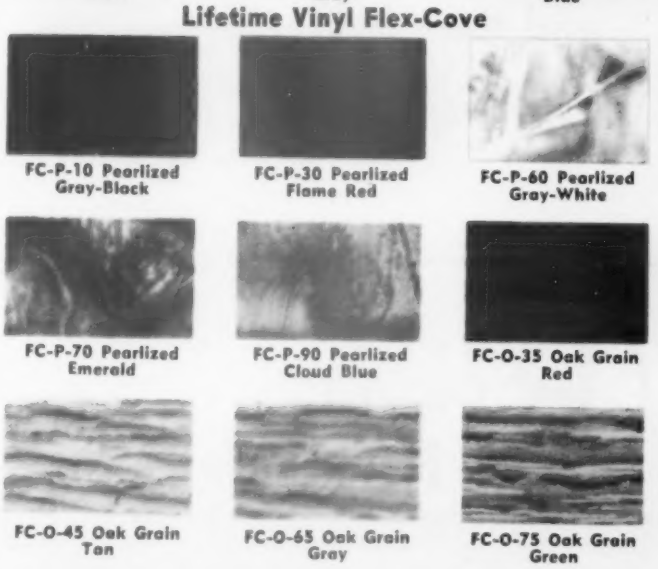


Inside and Outside Corners in 4" and 6" heights to match

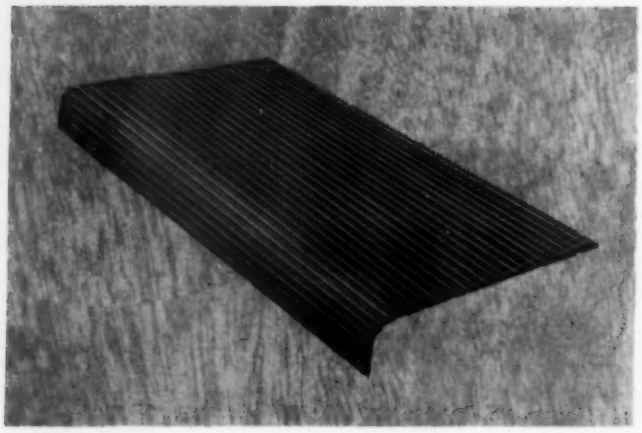
Lifetime Vinyl Cove

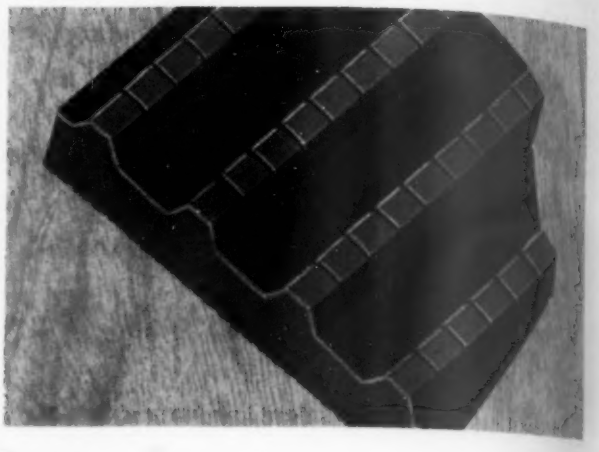


Lifetime Vinyl Flex-Cove



LIFETIME VINYL Safety Tread Runner





Treads

Will not oxidize, crack, curl or tear with age. Unaffected by oil, greases, fats, strong cleaners, gasoline, kerosene, alkalies or ordinary acids. Ink, iodine, fruit and similar stains are easily removed. Can be applied to wood, concrete or composition steps.

Thicknesses: 5/32 (.150"). All standard widths and lengths. Special widths and lengths available on special order.

Colors: Black, Brown, Beige, Terra Cotta, Gray, Green and Blue.

Runners

Non-skid, wet or dry, Lifetime Vinyl ribbed safety tread surface gives new walking comfort and decreases accident hazards for employees and customers. It is flexible, durable, will not crack or curl and stands up under hard service. The heavy duty gauge is ideal for industrial plants and the heavy traffic areas of stores and showrooms. The extra heavy duty Country Club type withstands the hard wear of golf spikes and other extreme conditions.

Types: Heavy Duty and Country Club Spike Proof.

Thicknesses: 5/32" (.150"), and ¼". Widths 24" and 36".

Lengths: 25-yard rolls—other lengths available on special order.

Colors: Heavy Duty: Black, Brown, Beige, Terra Cotta, Gray, Green and Blue.
Country Club Spike Proof: Gray, Green and Terra Cotta.

Robbins
Waterproof and Kem-Set Adhesives



Robbins Waterproof Adhesive: A waterproof, alcohol base adhesive which will not freeze. It is especially recommended for use with Robbins Lifetime Vinyl Tile, Rubber Tile and Cove Base.

Robbins Kem-Set Adhesive: A chemically setting adhesive for use on grade installations. Detailed instructions on the use of Kem-Set is available from the factory on request.

Robbins
Floor Products, Inc.
Tuscumbia, Alabama

Robbins modern floor products, installed and maintained in accordance with Robbins recommended specifications, will be a source of pride and satisfaction to you . . . through the years. Detailed information regarding our entire line is available through our nationwide distribution. Robbins distributors are located in all important cities. Write, wire or phone the factory in Tuscumbia for full information.



Where chemical abuse is prevalent, Vina-Lux answers the floor problem.

VINA-LUX REINFORCED VINYL TILE

AZPHLEX VINYLIZED GREASEPROOF TILE

DURACO GREASEPROOF INDUSTRIAL TILE

AZROCK ASPHALT TILE

AZROCK PRODUCTS MAKE BETTER SCHOOL FLOORS

AZROCK

ASPHALT TILE

School traffic and usage constitute a rugged test for any type of flooring. Only a real tough floor can withstand the scuffling, pounding traffic of school children. Azrock asphalt tile is that kind of flooring. It's a *better* asphalt tile, with a smoother, easier-to-clean surface, and with excellent resistance to alkali and moisture. Yet, Azrock costs no more than ordinary Asphalt Tile.

Azrock has been used widely in all types of school buildings for more than twenty years. Many of these floors are still serving today — still retain their good looks. They are a strong testimonial to the merits of Azrock as a long-wearing, economical, easy-to-clean floor.

Azrock is made in a wide variety of 27 attractive marbleized and solid colors, in two thicknesses and in five sizes. Wherever school floors call for low first-cost plus long wear, Azrock fills the bill. It will stretch your floor budget farther than any other type of flooring.

Azrock provides this classroom with a bright, attractive floor — with light reflecting colors that help children see better.



Azrock is built to take the severe punishment you may find in rooms like this combination gymnasium-auditorium.





Vina-Lux is ideal for use in areas subject to heavy usage such as the classroom shown at the right.

Hot cooking fat, food greases and heavy kitchen traffic have no detrimental effect on this beautiful, sanitary Vina-Lux floor in the school kitchen shown below.



Vina-Lux®

REINFORCED VINYL TILE

Vina-Lux adds beauty, smartness and top-drawer quality to public lobbies, community rooms, libraries and other dress-up areas of the modern school. It offers unrivaled color brilliance and variety with 18 stunning marbleized and 2 solid colors—light, bright colors with glamorous decorative appeal.

Vina-Lux has an amazing surface—a surface smoother than a baby's cheek yet tougher than fine leather—a surface that shrugs off dirt, oil, grease and most acids and alkalis. Vina-Lux can give you school floors that clean without hard scrubbing, gleam without waxing. Ordinary damp mopping keeps Vina-Lux looking new and bright in less time, with negligible cost.

Vina-Lux has stubborn resistance to indentation—a tough, rubber like flexibility that adds surprising strength and comfort underfoot—a dense, interlaced structure that means years of extra wear. This remarkable vinyl-asbestos tile flooring has about everything you could ask for in a school floor.

UVALDE ROCK ASPHALT COMPANY

Frost Bank Building • San Antonio, Texas

Makers of AZROCK • AZPHLEX • VINA-LUX • DURACO

"Azrock Makes Fine Floors"

AZROCK FLOORING PRODUCTS

AZPHLEX

VINYLIZED GREASEPROOF TILE

Here is a brand new concept in greaseproof tile flooring. The magic of vinyl resin has been added to Azphlex Thermoplastic Tile to give it added grease resistance, better colors, smoother surface, and greater resistance to abrasive wear. Azphlex is the only greaseproof tile in its price class that offers all of these qualities.

Here indeed is the perfect answer to the problem of what flooring to use in domestic science and home economics classrooms, school cafeterias and lunch rooms, and any other areas where food is prepared or served. Vinylized Azphlex is available in remarkably light colors that adapt themselves to modern school decor. For the first time you can now have a greaseproof floor that is both handsome and enduring under the exacting conditions that exist in food-serving and preparing areas.

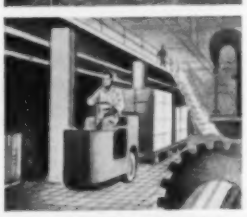
Many school architects are finding Vinylized Azphlex their choice for other areas in the school such as classrooms, auditoriums and corridors. Vinylized Azphlex means lower maintenance cost and greater light reflectance—both essential to modern school programs.



Vinylized Azphlex adds beauty and low maintenance cost to the modern home economics room.

DURACO GREASEPROOF INDUSTRIAL TILE









Duraco has been designed to provide a proper floor for vocational rooms and schools. It is another example of an Azrock Product engineered to solve a specific school floor problem.

Duraco will not soften or disintegrate from abuse by lubricating oils, gasoline or other commonly-used petroleum products. Duraco is tough and rugged—made to withstand light trucking of materials as well as the dropping of tools or other heavy objects.

For woodworking shops and for metalworking areas this floor is ideal. In addition, it has a smooth, dense surface that will not permit dirt, grease and grime to wear-in — hence, it is easy to clean at minimum expense. Duraco floors are as attractive as they are sturdy. You can choose from 12 colors — 6 solid and 6 marbleized.

School administrators and architects are urged to write for samples, technical data and a copy of the Azrock Installation Manual if desired. Such requests will be promptly and courteously handled.

SOLD AND INSTALLED BY APPROVED AZROCK FLOORING CONTRACTORS

CS—354—20M

With lowest

per foot

per year

cost



Terrazzo makes school history

Classes come and go; textbooks change and teachers retire; but Terrazzo goes on and on without recess, making history by withstanding the erosion of use and time.

Terrazzo serves elementary schools, colleges, and everything in between. Terrazzo is useful as a floor finish for corridors, labs, shops, machine rooms, toilets, washrooms, showers, and classrooms.. Terrazzo is efficient—for stairs wainscots, and wall base. Terrazzo adapts to any size or shape of area. Terrazzo, through use of white cement, color pigments and divider strips, provides unlimited variation of design and color. In short Terrazzo is as versatile as an architect's imagination.

Terrazzo's benefits extend beyond versatility and durability. Requiring an absolute minimum of maintenance, Terrazzo's slightly higher initial cost is more than offset by its longevity and stamina. The net result is lowest cost per foot per year. For detailed maintenance standards, please refer to the reverse side of this page.

1. **ECONOMY.** Initial cost is offset by freedom from repairs, replacements, and excessive upkeep over a period of years. This is usually far less than the long-range cost of other types of floors, since repairs, replacements, and upkeep are added to their initial cost.

2. **COMFORT.** Finished TERRAZZO is easy to walk on, less slippery than any waxed surface.

3. **CLEANLINESS.** TERRAZZO can be sealed so as to be practically non-absorbent. Its smooth, unbroken surface cleans easily, harbors no accumulation of germs, paves the way to aseptic cleanliness.

4. **COLOR AND DESIGN.** TERRAZZO has warmth and beauty. Specify any design, pictorial or geometric, in virtually any combination of colors.

5. **DEPENDABLE INSTALLATION.** This Association's objective is to see the TERRAZZO installations turn out exactly as wanted.

TERRAZZO MAINTENANCE

THE NATIONAL TERRAZZO & MOSAIC ASSOCIATION, INC.

WASHINGTON, D. C.

THE physical characteristics of terrazzo—or any flooring materials—must govern the methods and selection of materials for properly treating and cleaning it. Good terrazzo has a smooth surface that is 70% or more of marble, and less than 30% of neat Portland cement matrix. The marble granule is practically non-absorbent. The porosity of the matrix and its ratio of absorption are relatively low.

Suitable materials for treating or cleaning terrazzo floors will fill the original pores or have no effect on them. Harmful materials increase the number and enlarge the pores. Continued use of such harmful materials increases the maintenance problem and cost.

Terrazzo is benefited by a penetrating (not surface) filler or seal. The urgency for the need of such a penetration treatment varies with the floor. This Association recommends that the use of purely surface waxes, varnish preparations, and "good-for-anything" materials be avoided.

New terrazzo, when not given a special treatment, often has a dull, gray appearance. This is caused by a deposit of efflorescent, mineral salts that are a by-product of the setting and curing of the Portland cement. This chemical action continues at a decelerating rate over a period of months, unless the pores of the terrazzo are sealed. This is a normal condition and the deposit is removable by the regular maintenance operations.

New terrazzo and mosaic floors should be scrubbed two or three times a week, and mopped on alternate days. The cleansing agents must be free from alkali, acids, or other strong ingredients that may ruin the floor. The floor must be rinsed after each washing to prevent it from becoming slippery. After two or three months of this treatment, the floor will acquire a beautiful, natural sheen and will require less work for its upkeep.

Terrazzo does not need an artificial or applied surface. Its sheen and lustre are entirely natural. Properly laid terrazzo in its natural condition is a lifetime installation and needs only simple care to preserve its attractive appearance. Artificial or applied surfaces often create or contribute to slipperiness which is not an inherent quality of terrazzo.

Clean terrazzo is not slippery. The factors of slipperiness are the same as those encountered on any smooth surface; principally surface films such as wax, water, oil. A residual film of cleaning material is a common cause of slipperiness. When dirty water and solutions are allowed to dry on terrazzo, they form a film that dulls the appearance and natural color. A gummy or hardened accumulation of this film is often seen along the edges of a floor and a dirty streak is far too common on the wall base. When a heavy film is permitted to form through failure to properly gather up and rinse off dirty water, special work and materials are required to remove it.

Such work must be done by experienced men who can be trusted to handle the strong cleaners and the abrasive materials necessary without damaging the terrazzo. When the terrazzo has been restored to its natural, clean condition, only a little directed effort is needed to avoid the recurrence of film. The correct maintenance methods that do not damage the terrazzo and that maintain its natural beauty, actually cost the least over a period of time.

Low-cost maintenance is a primary consideration to every owner. Many building owners install terrazzo because of its and fail to get it because they are misled into using some cheap, unsuitable material which has a low pound or a low gallon price. The Association's standard specification warns that "soaps and scrubbing powders containing caustic alkali should never be used in the maintenance of terrazzo and mosaic surfaces." Labor is about 95 per cent of the cleaning cost. The difference in cost between cheap and good materials has almost no effect on your total maintenance bill. The cost of special care or the services of experienced men needed because of the use of poor materials far offsets the savings in cost—without considering the appearance and deterioration of your floor.

The proper methods for maintaining the appearance and service of terrazzo floors are very simple: If you seal or give a special treatment to your terrazzo, do it immediately following the installation or following a thorough cleaning so as not to seal in dirt or film. For suitable sealing materials consult any terrazzo contractor.

Mop the floor as frequently as the amount and type of traffic demands. Use a good, neutral cleaner or scouring cleaner solution containing the least amount of cleaner that experience demonstrates is sufficient to loosen the dirt. Remove the dirt and the dirty water and rinse the terrazzo clean.

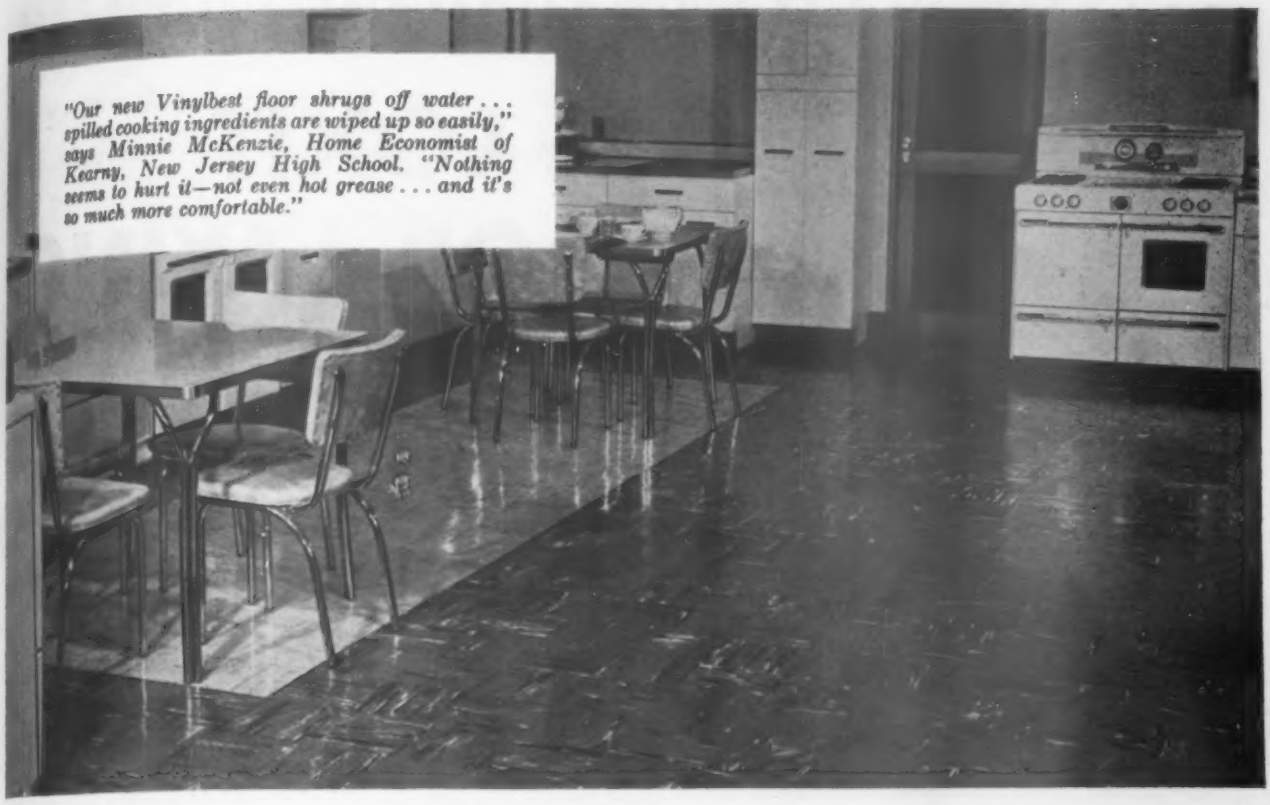
CAUTION: Sweeping compounds containing oil will penetrate and permanently discolor terrazzo.

Thoroughly and vigorously scrub terrazzo at the intervals determined by observing the effectiveness of mopping. The surface should be completely cleaned of all film. Stronger cleansers or abrasives are permissible for these occasional scrubbings, only if found to be necessary.

CONGOLEUM NAIRN, INC.
GOLD SEAL® FLOORS AND WALLS

Kearny, New Jersey

Inlaid Linoleum • Vinyl Inlaids • Vinyl Tile • Rubber Tile • Linoleum Tile • Asphalt Tile



You're not limited to hard, brittle tile!

GOLD SEAL VINYLBEST TILE

does a better, more economical job!

IT GOES ANYWHERE IN THE SCHOOL The closest thing to all-purpose tile, Vinylbest goes over concrete or wood—on, above or below grade. Because it goes anywhere, you can buy it in *quantity* ... always an *economy* . . . install it throughout the school!

IT'S ACID-AND-ALKALI RESISTANT Vinylbest resists acids, alkalis and greases that harm other tiles . . . that's why it's *perfect* for home economics and science labs.

IT'S MOISTURE-AND-FIRE RESISTANT You can't beat Vinylbest Tile for resistance to splashes from water fountains and sinks ... or for resistance to fire (a safety factor too important to overlook in school flooring).

IT'S RESILIENT; MORE COMFORTABLE Hard, brittle tile clatters under foot; resilient Vinylbest Tile cuts distractions and fatigue in hallways, classrooms.

IT'S CLEARER, SMARTER COLORED Vinylbest Tile gives you an exclusive foam marble decoration . . . a higher gloss . . . in 13 *premium* colors at a standard price . . . ⅛" gauge, 9" x 9" tiles.

IT ACTUALLY COSTS LESS Though you pay about twice as much for it as hard, brittle tile, Gold Seal Vinylbest Tile is so much easier to maintain . . . so much longer wearing . . . it actually costs you less in 20 years!

YOU GET THE GOLD SEAL GUARANTEE of satisfaction or your money back . . . with *every* Gold Seal Floor. See a partial listing of Congoleum-Nairn's complete line, above.

Free booklet, "Which Floor Goes Where in Commercial Areas"... just write: Commercial Service Dept., Congoleum-Nairn Inc., Kearny, N. J.

LOXIT SYSTEMS, INC.

1217 W. Washington Blvd., Chicago 7, Illinois

"...the secret of a good floor!"

The LOXIT FLOOR-LAYING SYSTEM



CONSULT YOUR ARCHITECT

Floors are very important. The advice of your architect at the earliest planning stage can often save you time, trouble and money not only at the time the floors are laid but in their life-long maintenance.

A WELL-LAID floor is long-range economy. It will pay dividends year after year, reducing maintenance costs while retaining the proper resiliency for a good playing or working floor. Consider, too, the economy of the Loxit Floor Laying System. For instance, the total thickness of a Loxit-laid floor using 25/32" flooring is only 1-1/8", a saving of TWO INCHES in story height over ordinary wood sleeper type construction; and, in addition, there is a cost saving 10% to 15% when using Loxit to lay wood floor on concrete slab. Loxit eliminates wood sleepers, wood sub floors, nails and adhesives.



Write today for catalog, details and samples

LOXIT SYSTEMS, INC., 1217 W. WASHINGTON BLVD., CHICAGO 7, ILLINOIS

AMERICAN MASON SAFETY TREAD CO.

Lowell, Mass.

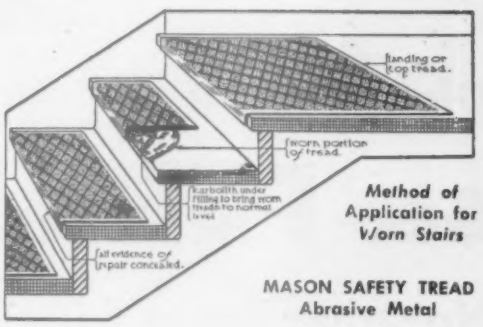
REPRESENTATIVES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

MASON SAFETY TREADS

Abrasive Metal — Ribbed Type — Universal

For Stairways · Stair Landings and Ramps

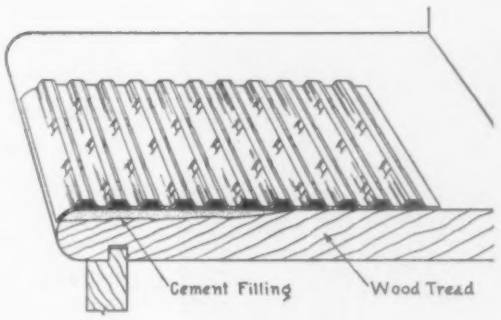
Over Fifty Years of Service to Educational Institutions



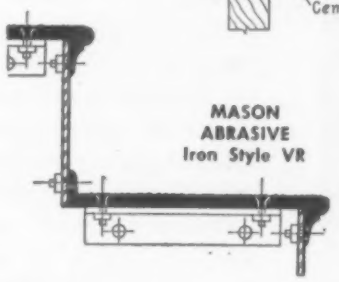
Method of Application for Worn Stairs

MASON SAFETY TREAD
Abrasive Metal

For years **Mason Safety Treads** have filled a very definite need in preventing accidents on stairways, entrances and other heavy-traffic walkway surfaces. With Mason Treads, whether you install the Abrasive Metal, the Ribbed Type in brass or aluminum, or the Universal Type, your SAFETY problem will be satisfactorily solved. All types can be quickly and economically installed by your own workmen.



MASON SAFETY TREAD
Universal Type



MASON
ABRASIVE
Iron Style VR

At Right and Below:
SELF-SUSTAINING TREADS
Used with Steel Risers

When you specify **Mason** products, you are assured of receiving **individualized attention** to your particular problem, **intelligent engineering service,** and a **quality product at a fair price.**



SPECIFICATIONS—SAFETY TREADS

New Steel Construction—All stair treads and platforms as shown on plans shall be Mason Abrasive Iron Style VR (or other style as selected) with cross-hatched (plain or fluted if preferred) surface as manufactured by the American Mason Safety Tread Company, Lowell, Mass. Suitable steel supports and stringers with carrier angles shall be provided for securely bolting treads and platforms in place. Sheet steel riser plates (state gauge) shall be bolted to nosings and riser lips of the Safety Tread. Thickness of treads and platforms shall conform to the manufacturer's established standards.

New Concrete or Pan-Filled Construction—All stair treads including floor and landing-level steps shall be provided with Mason Abrasive Iron Safety Treads Style M (or H or G) cross-hatched surface as manufactured by the American Mason Safety Tread Company, Lowell, Mass. (Mason Universal Type II, Style B Safety Tread, steel with lead inserts, may be substituted.) Safety Treads shall be 3" wide (minimum) and extend from stringer to stringer (for reinforced concrete construction, safety treads may extend to within 3 inches of stringers.) Standard concrete anchors, spaced according to manufacturer's recommended practice, shall be used to secure safety treads in place.

TYPICAL MASON INSTALLATIONS

HARVARD UNIVERSITY
Cambridge, Mass.
MONTREAL WEST HIGH SCHOOL
Montreal, Quebec
BROWN UNIVERSITY
Providence, R. I.
PROVINCIAL NORMAL SCHOOL
Fredericton, N. B.
CULVER MILITARY ACADEMY
Culver, Ind.
UNIVERSITY OF MINNESOTA
Minneapolis, Minn.
U. S. MILITARY ACADEMY
West Point, N. Y.
U. S. NAVAL ACADEMY
Annapolis, Md.
UNIVERSITY OF FLORIDA
Gainesville, Fla.
PRINCETON UNIVERSITY
Princeton, N. J.
LOUISIANA STATE UNIVERSITY
Baton Rouge, La.
WILLIAMS COLLEGE
Williamstown, Mass.
AND HUNDREDS OF OTHERS

Write for copy of the MASON catalog—sent free on request to any school official or architect.

AMERICAN ABRASIVE METALS CO.

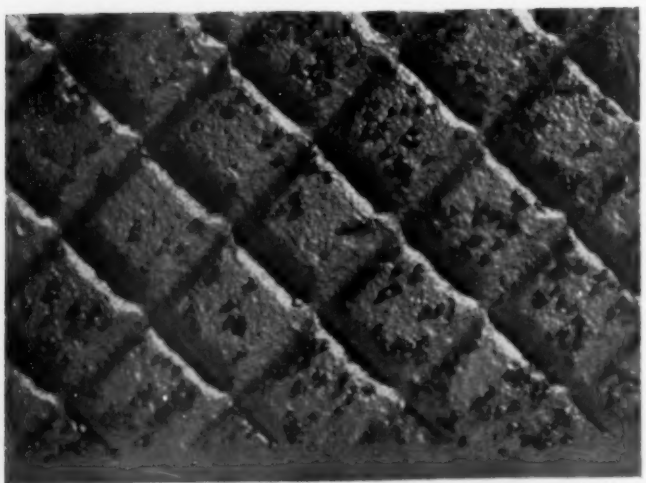
Irvington 11, N. J. Offices in Principal Cities

MAINTENANCE FREE, NON-SLIP PRODUCTS FOR STAIRWAYS AND FLOORS

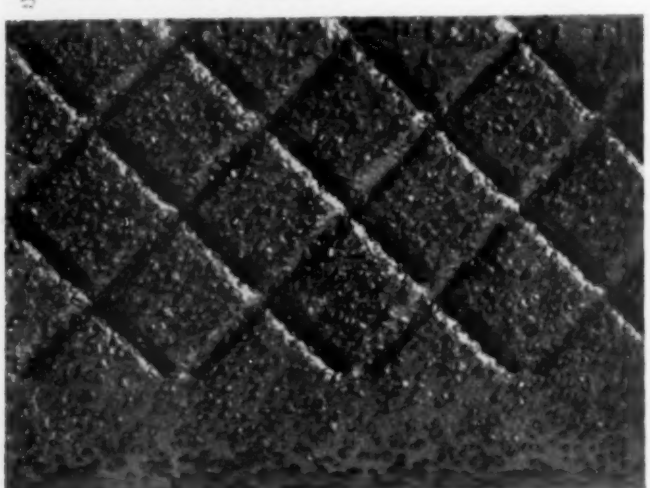
Glance at the photographs and

See FERALUN® superiority

No Other Tread Equals Feralun in Safety and Durability



Here is an unretouched photo of a *typical competitive tread* after acid test. (Acid is used to eat away the metal base so as to expose the actual abrasive content of the tread.) Note the meager amount of abrasive and spotty distribution.



Here is an unretouched photo of a *Feralun tread*, taken after the same exposure in the acid bath. Note the full and even distribution of abrasive . . . for greater safety, longer wear.

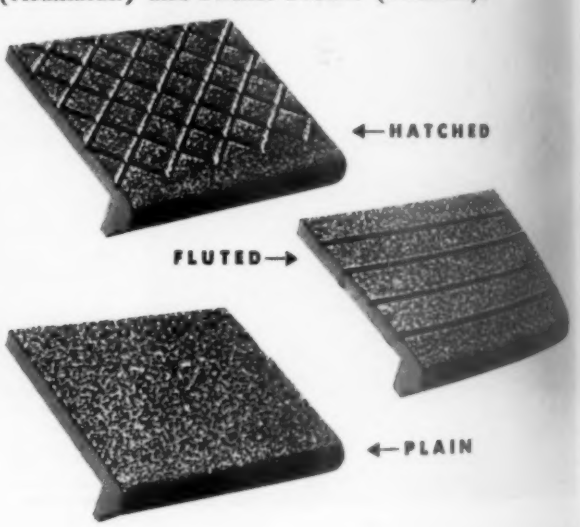
The life and non-slip effectiveness of any abrasive tread is approximately proportional to the amount of abrasive embedded in the surface. Note the quantity of abrasive in the Feralun tread and the evenness of its distribution. Note particularly how the abrasive in the Feralun tread extends over the nosing edge where the danger of slipping is greatest. The pictures tell the story. These treads were acid-etched to remove the top portion of the iron matrix without disturbing the abrasive grain. We urge you to make this simple test yourself and will gladly send you full instructions on how to do so.

Feralun treads are made in three surfaces — hatched, fluted or plain — and are available as full treads or nosings; also as thresholds and floor plates.

Feralun has been widely used in schools and other public buildings. It has no equal for non-slip safety, durability, freedom from maintenance.

Cast to fit, Feralun is quickly installed in either new or repair installations. Write for Feralun Bulletin today.

Available also in Bronze (Bronzalun), Aluminum (Alumalun) and Nickel Bronze (Nicalun).



Trowel On FERROX® for Safety

NON SLIP • LOW COST • LONG LASTING
EXCELLENT FOR DANGER AREAS

Ferrox is a plastic, abrasive, non-slip compound that makes indoor or outdoor walkways safe regardless of whether they're slippery, wet or oily. It's easy to apply, goes on with a trowel, dries in 6 to 8 hours. One gallon of Ferrox covers from 30 to 40 sq. ft., thickness about 1/16". It comes in red, black, gray, blue and green.

Ferrox has given years of service. It may be applied over concrete, wood, stone, metal or practically any other surface. A few of the many school applications are pictured here. Others include building entrance ways, floor areas around edges of swimming pool, shower stalls and locker rooms.



Ferrox for safe footing near dangerous machine (Webster Junior High School, Newark, New Jersey)



Ferrox on steep ramp (Floral Park School, Floral Park, Long Island, New York)



Ferrox in sloping corridor (Floral Park School, Floral Park, Long Island, New York)



Ferrox in industrial arts shop (Webster Junior High School, Newark, New Jersey)



Ferrox in auditorium aisle (Floral Park School, Floral Park, Long Island, New York)

MELFLEX PRODUCTS COMPANY, INC.

410 South Broadway, Akron, Ohio • In Canada: 43 Lyngrove St., Toronto 9, Ontario

MANUFACTURERS OF SAFETY MOLDED RUBBER STAIR TREADS, MEL-ISLE FLOORING, RUBBER AND VINYL PLASTIC LINK MATS, ENTRANCE MATS, MATTING, ETC.

MELFLEX SAFETY Molded Rubber Step Treads—*Black or Marbleized Colors . . .*

Black—Heavy Duty Treads. Compounded of special "frictioned" rubber for long, low-cost service and maximum slip-resistance, wet or dry . . .

Approved by Underwriters' Lab., Inc. S.A. No. 833



Square Nose Type

Treads are ¼" thick, molded of "frictioned" rubber to fit over approach edge of step. Built especially for hard, constant, scuffing wear and to assure maximum slip-resistance and noise reduction . . . They can be applied to steps outdoors or indoors on any type of base construction—wood, metal, concrete, terrazzo, tile—without the need of special holding strips. Treads are easily cemented to base with MELASTIC Water-Proof Bonding agent for permanent, trouble-free service. Grid pattern surface acts to drain moist soil and water from tread to provide a SAFE stepping surface wet or dry. They never become slippery or hazardous.

We supply these treads trimmed to fit your step specifications in either curved nose or square nose type. Maximum size in one molded tread—20 inches deep x 72 inches tread width.

Marbleized Colored Treads

Treads are 3/16" thick in marbleized colored patterns that run through to the underside of tread . . . Colors available are: Green with white marbleizing, blue with white marbleizing, brown with tan marbleizing, terra-cotta with white marbleizing, gray with black and white marbleizing and black with white marbleizing. Treads have same tread design as the Heavy Duty Black and can be supplied trimmed to fit your step specifications up to 20" deep x 62" wide.



MEL-ISLE

Heavy Duty Ribbed Runner . . .

An exceptionally durable runner material for halls, corridors, locker rooms, ramps . . . Black "frictioned" rubber compound, highly slip-proof, ruggedly resistant to hard, scuffing wear. Supplied trimmed to fit your specifications or in rolls up to 40" wide x 25 yards long. ⅜" thick. Marbleized colored Mel-Isle, 3/16" thick to match marbleized molded treads for step-wells, landings, or floor covering can be supplied in any size up to 36" width x 25 yards long.

MEL-FLOR, smooth-surfaced, plain or marbleized colors in ⅛" and 3/16" thickness for step risers or area coverings can be supplied to your specifications from maximum stock widths of 36" x 25 yards long.



Curved Nose Type

LINK MATS—Custom-Made for any Size or Shaped Area—Links of "Frictioned" Rubber, Colored Rubber or Vinyl Plastic . . .

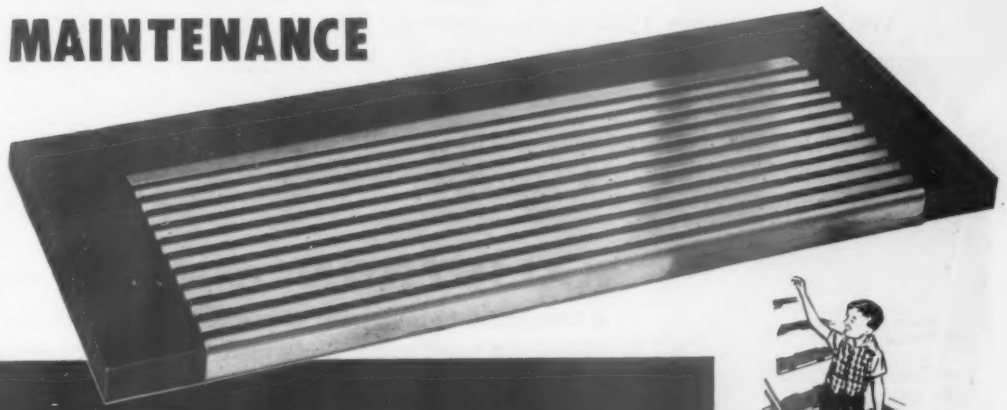
Links ½" thick are woven on special rust-resisting steel wire. Mats may be made to conform to any area requirements . . . Black Rubber, "Frictioned" Rubber, Colored Rubber and Vinyl Plastic links are used for making these mats to meet varying requirements—for entrances, lobbies, safety mats about machines, cushion mats for kitchens, or serving aisles, oil or grease-resistant mats . . . Complete information will be furnished on all types of mats through our catalog. Write for it.

WOOSTER PRODUCTS, INC.

Wooster, Ohio

Now the easy economical way to end STAIRWAY MAINTENANCE

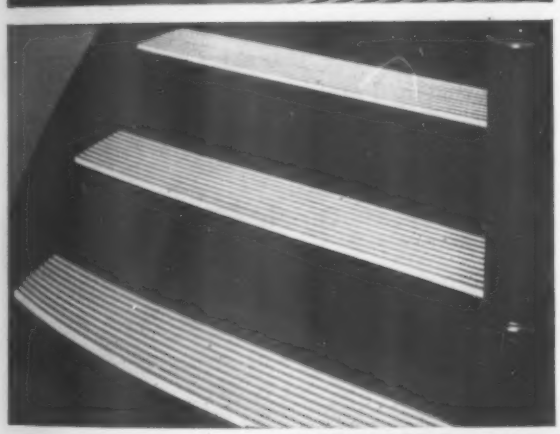






'STAIRMASTER' metal safety tread





- LIGHTWEIGHT LONG-LASTING ALUMINUM ALLOY CONSTRUCTION
- FOR ALL STAIRS — WOOD, CONCRETE, SLATE, MARBLE, ETC.
- SCIENTIFICALLY DESIGNED ANTI-SLIP METAL TREAD
- POSITIVE ANTI-SLIP SAFETY RIBS
- QUICKLY INSTALLED by your janitor or a contractor even during school days

EASY TO ORDER
Standard 9" depth. Length as required. To figure length merely measure your stairs and subtract 6 inches.



FREE
BOOK ON STAIRWAY SAFETY

FOR YOUR COMPLIMENTARY COPY SEND REQUEST TO . . .

Wooster PRODUCTS INC., Wooster, Ohio

UNITED STATES PLYWOOD CORPORATION

World's Largest Plywood Organization

("Wall Center, U. S. A.")

Executive Offices: Weldwood Building, 55 West 44th St., New York 36, N. Y.
Distributors Throughout The Country

We're specialists in wall treatments. That's why United States Plywood Corp. has come to be called "Wall Center, U. S. A." In addition to plywood in many forms (see separate catalog page) we offer flexible wall coverings described and illustrated below. You are sure to find the one "right" product for every application.



KALISTRON — Finest plastic covering material

A transparent vinyl "coat of armor" shields this rich wall covering . . . its color is fused to the underside. Virtually impervious to scratches, scuffs, stains, roughhouse. A damp cloth cleans it. 33 colors. Marvelous Kalistron adhesive prevents open seams. Ideal wherever traffic is heavy, such as for corridors, stairs, etc. Also made in matching upholstery grades.



KALITEX — Utility plastic covering material

Gives more protection than any other wall covering at anything like the price. Made much like Kalistron, with the same vinyl-protected beauty. Low in cost, yet its luxurious rough textured pattern is distinctively different. Combines relatively low cost with great beauty and durability.



FLEXWOOD — Matched grain wood in flexible sheets

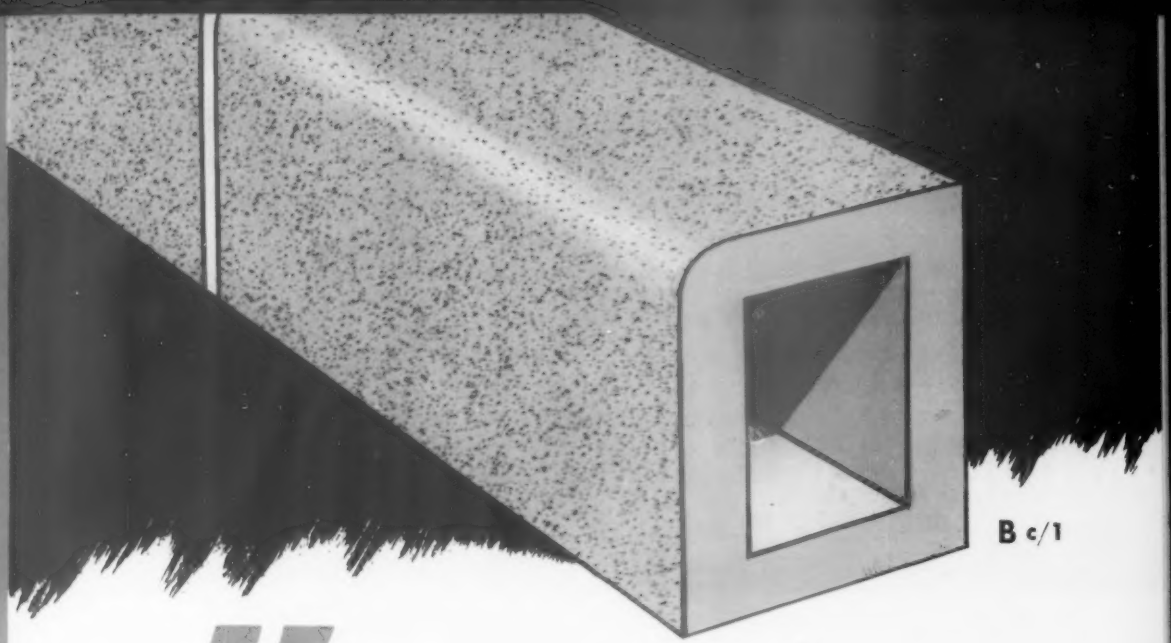
Genuine wood panelling in flexible form. Hence, you can curve it, wrap it around posts, get stunning matched grain effects over wide areas. Meets fire code requirements. Over 1.7 million feet installed in 1953. Every installation guaranteed. Widely used in offices, auditoriums, meeting rooms, etc.



RANDOMWOOD — Random grained wood in flexible sheets

Similar to Flexwood except the shading of the wood varies, giving an interesting "random" effect. Use it where imagination is high but budget is low. May be hung by any good mechanic. Effective for a whole room or a dramatic single wall. First cost is last cost for years.





Keramet

STRUCTURAL FACING TILE

by Metropolitan

DESIGNED TO SAVE YOU TIME AND MONEY ON YOUR NEXT SCHOOL

for { **Classroom, Corridor or Cafeteria**
Gymnasium or Shower Room
Laboratory or Lavatory

In Keramet Tile you have a structural building unit (made of genuine clay with a ceramic glazed finish) that meets all specifications for *top performance* at *reduced first cost* and *minimum maintenance*.

With Keramet you build and finish the wall in a single operation. What's more, you do it faster and at lower cost (than ever before possible with ceramic glaze) while getting the utility and economy of Keramet features including:

1—ELIMINATION of painting or any refinishing, and the REDUCTION of maintenance assured by ceramic glaze.

2—PREVENTION of unsightly wall cracks (and replacement) due to contraction and expansion—a special advantage for specifier and owner, made possible by ceramic glaze on genuine clay structural tile.

Metropolitan Keramet is manufactured in an attractive speckled satin-mat finish . . . in a neutral shade that complements any color scheme. Samples are immediately available on request.

Metropolitan Brick, Inc.

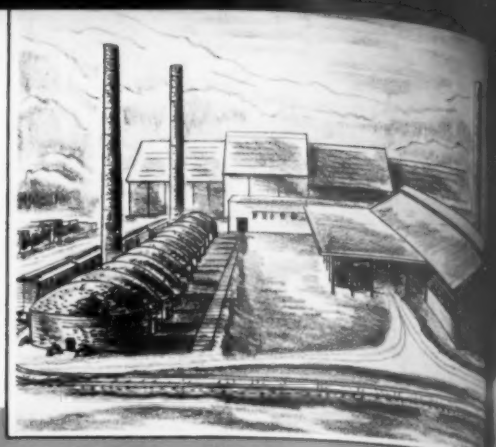
1019 RENKERT BLDG. CANTON 2, OHIO

"SERVING THE AMERICAN CONSTRUCTION INDUSTRY FOR MORE THAN HALF A CENTURY"

AIA File No. 10-B
Glazed Structural Facing Tile

Here's where Keramet is made

Quality raw materials—skilled clay handlers—modern equipment—adequate production capacity—centrally-located for economical rail and truck shipments. Providing these facilities, Metropolitan's plant at West Darlington, Pa., was a logical choice for the manufacture of Keramet units. In addition, Keramet Tile is backed by more than half a century of experience in clay processing . . . a structural building unit which will enable you to simplify your design work, save construction time and reduce building costs.



Metropolitan Keramet SPECIFICATIONS

SCOPE This specification covers "A" Quality Keramet Tile, a Ceramic Glazed Structural Facing Tile manufactured by Metropolitan Brick, Inc.

DESCRIPTION The finished face or faces of all Keramet units that will be exposed when in place, shall be covered with a permanently colored, opaque, satin-mat finish ceramic glaze. This glaze is compounded of metallic oxides, chemicals and clays, and in which is suspended a prepared specking compound prior to being sprayed on a previously-formed body. The units then shall be burned at high temperatures, fusing the glaze to the body and making them inseparable.

Color and texture of the finished surface shall be indicated by a sample consisting of not less than three stretcher units. The glazed finish shall be free from chips, crazes, blisters, crawling or other imperfections detracting from the appearance of the finished wall when viewed at a distance of five (5) feet.

Coring, shell and web thickness shall be in accordance with ASTM Specification C126-52T for hollow masonry units. The body of the units shall be free from cracks or other imperfections that will impair the strength or durability of the masonry.

SHAPES AND SIZES Keramet Tile shall be furnished in Modular Size 6T Series (5⅓ x 12" nominal face size) and in 2", 4", 6" or 8" nominal thickness.

Keramet Simplified Shapes, as shown on the opposite page, shall be furnished as necessary to make a well-completed job.

Keramet Tile is designed for use with an approximate ¼" mortar joint.

COMPRESSION STRENGTH Compressive strength (based on gross area) shall be not less than 2,000 lbs. per square inch for an average of five units, and not less than 1,500 lbs. per square inch for any individual unit.

ABSORPTION Average absorption of five units by twenty-four (24) hour submersion in cold water shall not exceed 5 per cent, and the absorption of any individual unit shall not exceed 7 per cent.

PROPERTIES OF FINISH All Keramet units shall meet the requirements of ASTM Specification C126-52T for imperviousness, opacity, resistance to chemicals and resistance to crazing.

DISTORTION TOLERANCES Maximum permissible distortion of the plane and the edges of the face of individual units from a plane surface and from a straight line, respectively, shall not exceed 3/32".

FACE DIMENSION TOLERANCES

Total variation in the finished face dimensions shall not exceed the amounts shown at right:

Specified Face Dimension Height & Length	Maximum Difference Between Dimension of Any Unit & Specified Dimension		Maximum Difference Between Largest & Smallest Unit in Lot
	If Larger	If Smaller	
5-1/16"	1/16"	4/32"	4/32"
11-3/4"	1/16"	7/32"	8/32"

BED DEPTH DIMENSION TOLERANCES

Total variation in the bed depth dimensions shall not exceed the amounts shown at right:

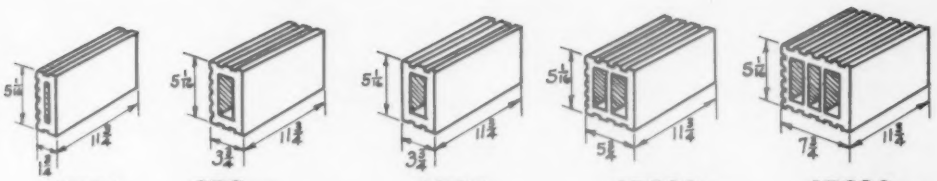
Specified Bed Depth Dimension (Wall Thickness)	Maximum Difference Between Dimension of Any Unit & Specified Dimension		Maximum Difference Between Largest & Smallest Unit in Lot
	If Larger	If Smaller	
1-3/4" Single Face	1/8"	2/16"	2/16"
3-3/4" Single Face	1/8"	3/16"	3/16"
3-3/4" Double Face	1/8"	2/16"	2/16"
5-3/4" Single Face	1/8"	4/16"	4/16"
7-3/4" Single Face	1/8"	5/16"	5/16"

NOTE. These specifications comply with ASTM Specification C126-52T for ceramic glazed structural clay facing tile, and are given above for the convenience of the reader.

Keramet 6T SERIES MODULAR SHAPES

Here is the simplified line of Keramet Shapes that save detailing and construction time, and still meet all normal requirements

STRETCHERS



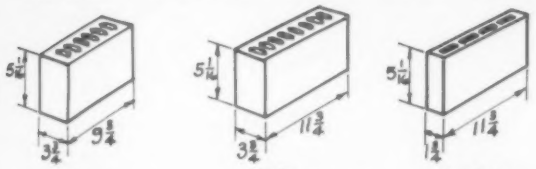
6TCA **6TCgr** (shown) **6TCD** **6TC60gr** **6TC80gr**

6TCsu (smooth unglazed back)

6TCsm (smooth unselected glazed back)

QUOIN (SQUARE) JAMBS & STARTERS

GROUP 1



5T2 (shown)

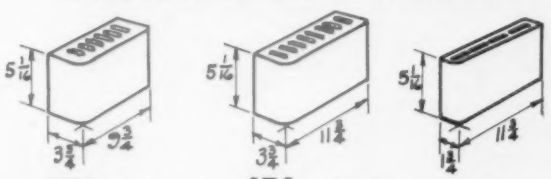
5T2B (kerfed for 1¾" thickness, with 3¾" return)

6T2 (shown) **6T2A**

6T2B (kerfed for 1¾" thickness, with 3¾" return)

3T2 (5¾" length)

BULLNOSE JAMBS & STARTERS



5T4 (shown) **6T4** (shown) **6T4A**

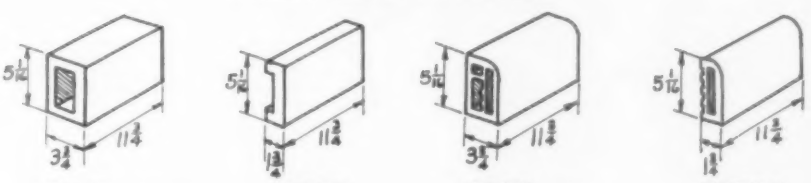
5T4B (kerfed for 1¾" thickness, with 3¾" return)

6T4B (kerfed for 1¾" thickness, with 3¾" return)

3T4 (5¾" length)

SILLS, CAPS & LINTELS

GROUP 2



6T10 (shown) **6T10A**

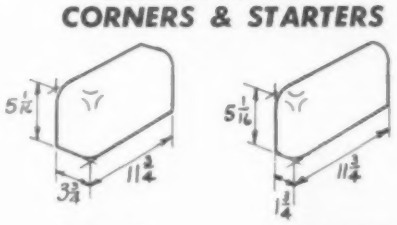
6T10B (kerfed for 1¾" thickness, with 3¾" return)

6T20 (shown) **6T20A**

6T20B (kerfed for 1¾" thickness, with 3¾" return)

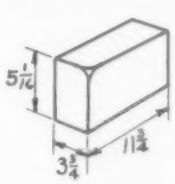
BULLNOSE CAP – CORNERS & STARTERS

GROUP 4



6T24R **6T24AR**

SILL STARTER



6T304R

NOTE: All units illustrated are to show shape and size of glazed area, and do not necessarily illustrate mechanical construction which is subject to change without notice.

Number with suffix R denotes right hand shape. Similar left hand shape takes suffix L.

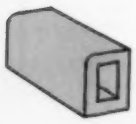
IN ADDITION, Metropolitan Ceramic Glazed Structural Facing Tile is available in a full line of "Engineered Colors" and Trim Shades: 6T and 4D series. See your nearest dealer, or contact . . .

Metropolitan Brick, Inc.

1019 RENKERT BUILDING CANTON 2, OHIO

Keramet { somewhere in every building; everywhere in some buildings





Practical for all types of structures—you achieve a complete wall in one operation, eliminating the expense of building plus veneering—Keramet Tile is particularly adaptable to school and hospital construction wherein economical first cost and reduced maintenance are major factors. In addition, Metropolitan Keramet is

VERSATILE to meet individual design ingenuity (popular 5⅓ x 12" face) . . . universal color to harmonize with any decorative plan

MODULAR for simplified detailing on the board . . . faster job-site installation through simplified shapes and sizes

GLAZED for easy maintenance, sanitation, low light reflectance and the enduring beauty of ceramic glaze on *genuine clay*

DURABLE to withstand hardest "wear and tear" from school to hospital to industry

QUALITY-CONTROLLED for consistent shading, as well as to meet ASTM Standards and Building Code requirements

ECONOMICAL to design with, work with and maintain . . . BUILD AND FINISH A PERMANENT WALL IN A SINGLE OPERATION



. . . FOR ADDITIONAL COLORS

To keep pace with steady advances in use of color, Metropolitan for years has ceramic-glazed structural facing tile in "Styled" Colors to "build and color-finish at one time." Because they do meet the tions of leading color researchers, Metro "Engineered Colors" enable designers every advantage of the DECORATIVE FUNCTIONAL VALUES of "the right the right spot." There are 11 Field Colors cluding three mottles) and two Trim the line; full color catalog, construction samples on request.

Dealers in All Major Building Centers

Member of Facing Tile Institute

Metropolitan Brick, Inc.

1019 RENKERT BUILDING CANTON 2, OHIO

NATCO CORPORATION

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The Double Feature building material



"8W" Series Vitritile

Features ground edges—for uniform, narrow mortar joints; and large unit face size (nominal 8" x 16")—for a minimum number of joints in the wall.

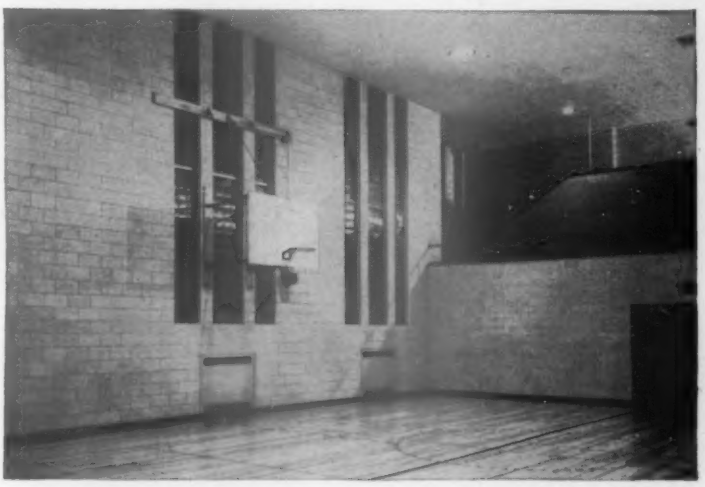


Natco "6T" Series Vitritile in Shades Valley High School, Homewood, Alabama
Architects: Van Keuren, Davis & Company

NATCO structural ceramic glazed

VITRITILE

builds strong, load-bearing walls with interior finish of life time beauty— all in one operation



Natco "8W" Series Vitritile in Wauwatosa High School, Wauwatosa, Wisconsin
Architects: Herbst & Kuenzle

Many schools throughout the country are enhanced with Natco Structural Ceramic Glazed VITRITILE—the one building material with a double-barreled construction advantage . . . builds a sound structural wall *plus* a colorful, everlasting wear-proof interior finish—all in one operation!

In lunchrooms, class rooms, locker rooms, corridors, gymnasiums and cafeterias, this versatile material is being specified for its ability to withstand dirt, vandalism and marring. And it will look as beautiful years ahead as it does when erected—inexpensive washing with soap and water is all the maintenance it ever needs.

Architects, builders and contractors are sold on the many service advantages of durable Natco Vitritile. There's less labor, less cutting, less material waste at erection. This flexible unit adapts to any design idea—offers a wide selection of colors too. Put double-feature Natco Structural Ceramic Glazed Vitritile to work on your school building jobs. Time-tested installations prove it lowest in cost over the years.

17 STRATEGICALLY LOCATED CLAY PLANTS

THE MOSAIC TILE COMPANY

General Offices: Zanesville, Ohio

MOSAIC

Member—Tile Council of America
and The Producers' Council, Inc.
Offices, Showrooms and Warehouses from Coast to Coast
Over 4000 Tile Contractors to serve you.



THE NEW MOSAIC 9" x 6" x ½" GLAZED WALL TILE on this school corridor wainscot is the finest ceramic material yet developed for this application. It demonstrates the popularity of this practical finish over other wall surfaces.

Mosaic Clay Tile . . . the specified material for school building floors and walls.

School administrators and architects, alike, select Mosaic Clay Tile for floors and walls that keep their beauty, cut maintenance to a bare minimum and never need refinishing . . . for the life of the building. Mosaic Tile is easy on the construction budget, and its first cost is its last!

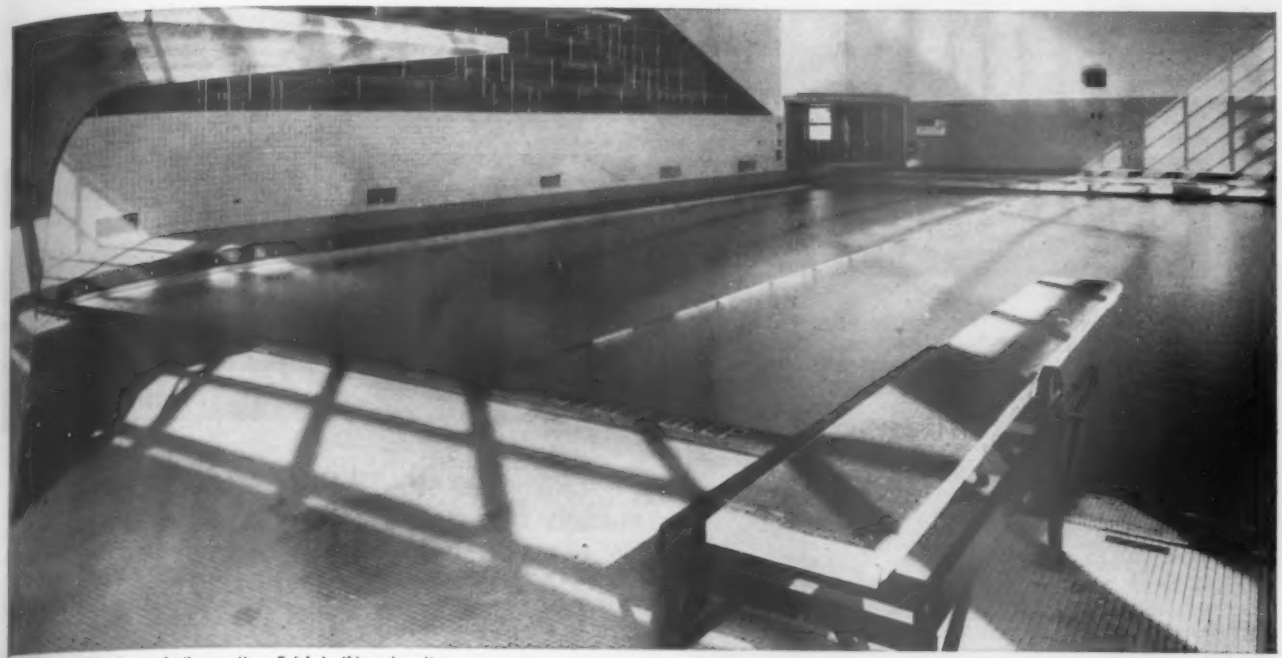
The wide Mosaic Tile line covers a specific type of clay tile for every school purpose, including the new large size 9" x 6" (½" thick) Mosaic Glazed Wall Tile. This tile was specially developed to create large scale character for large areas in institutions . . . corridors, auditoriums, cafeterias, kitchens, swimming pools. Available in Harmonitone and Bright Glaze Wall Tile Colors.

Another installation of large size 9" x 6" x ½" Glazed Wall Tile. This takes lots of abuse . . . cafeteria wall and counter-front require little care. Sanitary! Colorful! Permanent!



THE MOSAIC TILE COMPANY

Offices: Atlanta • Baltimore • Boston • Buffalo • Chicago • Dallas • Denver • Detroit • Fresno • Greensboro • Hartford • Hempstead, L. I., N. Y. • Hollywood • Little Rock • Miami • Milwaukee • Minneapolis • New Orleans • New York • Philadelphia • Pittsburgh • Portland • Rosemead, Calif. • Salt Lake City • San Francisco • Seattle • St. Louis • Tampa • Washington, D. C. • Zanesville.



Ceramic Mosaic Tile gives a lasting sanitary finish to this university pool lining and deck, as well as colorful beauty and safety under foot. Surrounding walls of Mosaic Glazed Wall Tile.



In this close-to-perfect "Classroom of Tomorrow," one wall of Mosaic Granitex Tile provides an area restful to the eye, with color and texture in interesting contrast to other room materials.



MOSAIC FORMFREE* PATTERNS AND DECORATED TILE add colorful charm and interesting scale! This floor is a Mosaic Formfree Pattern in Granitex Mosaics. Unlimited variety with no extra expense! Many patterns available.



Mosaic Clay Tile for every school building need . . .

GLAZED WALL TILE in Harmonitone and Bright Glazes. The top value of all wall materials, in every desired color and in several sizes.

CERAMIC MOSAICS small-unit unglazed integral color porcelain tile for floors and walls, are made in a wide range of soft, rich colors and patterns.

GRANITEX MOSAICS, small-unit, natural clay type, unglazed, with mottled earth color and native non-slip texture, provide unlimited design treatment for floors, walls, and exterior surfaces.

CARLYLE QUARRY TILE, a product of Mosaic, in larger units, for heavy duty floors and walks. Warmly colorful natural clay type. Several colors suitable for outdoor use.

FAIENCE TILE, hand-crafted by Mosaic, is unmatched for special decorative effects in floors and walls, indoors and out.

• Copyright 1951 by The Mosaic Tile Company

When you plan to build, or modernize, learn why Mosaic Clay Tile is your best buy in beauty and utility for your school buildings. Consult your architect, builder or tile contractor. Write Dept. 13-6, The Mosaic Tile Company, Zanesville, Ohio, for helpful tile literature.

UNITED STATES QUARRY TILE CO.

Member: Tile Council of America and The Producers' Council, Inc.

General Offices: 217-L Fourth St., N. E., Canton 2, Ohio

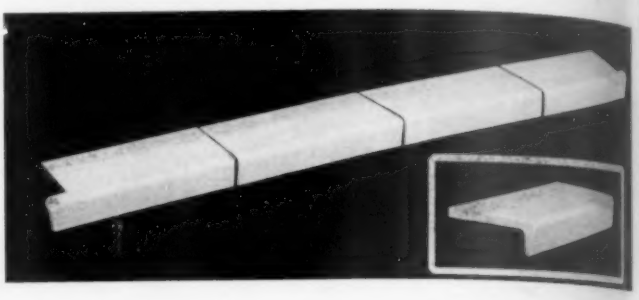
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401 North Broad St.
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ROMANY TILES

—for—

WALLS
TOILETS
SHOWERS
KITCHENS
CLASSROOMS
CAFETERIAS
CORRIDORS
FOYERS
FOUNTAINS
AUDITORIUMS





ROMANY GLAZED WINDOW SILLS

ROMANY Window Sills are available in all Buff Body wall tile colors. This palette of non-fading colors from deep bright to subdued shades provides a wide range for color selection. ROMANY Window Sills, with their hard glaze finish, assure a permanent moisture and stain proof "easy to clean" surface.

ROMANY TILES FOR CLASSROOMS

The illustration below shows how ROMANY Tiles can be used in the classroom to add color and more pleasant environment. More important is the saving in maintenance. The marks on the wall under the chalk boards or bulletin boards can be washed off without damaging the tile surface. ROMANY Tile never needs painting nor patching.



ROMANY 6 x 9 WALL TILES

ROMANY 6 x 9 Wall Tiles are Buff Body tiles for interior use, available in a wide range of color. These new large unit tiles possess the same finished "easy to clean" surface as smaller units. They can be readily adapted to remodelling work and can be installed on plaster, concrete or masonry surface with an adhesive.

FREE CATALOGUE

Catalogue of more detailed information and illustrations of helpful suggestions will be sent free upon request. Please address requests to our Canton office.

JOHNS-MANVILLE

General Offices: 22 E. 40th St., New York 16, N. Y.

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Johns-Manville Offers THE COMPLETE INTERIOR— Walls, Ceilings, Floors

The Johns-Manville System of Unit Construction provides a practical, proved solution to the problem of changing space requirements giving the flexibility necessary in school buildings. To expand or subdivide schoolroom units or to convert a school from one type to another, Johns-Manville offers walls, ceilings and floors as a single unit under a single specification and one manufacturer's responsibility.

J-M Asbestos Movable Walls—These walls are movable, salvageable, easily erected and as easily dismantled and re-located, yet possess the stability and appearance of permanent wall construction.

J-M Acoustical Ceilings—Demountable acoustical units which provide for the installation of fluorescent lighting and the latest types of heating and air-conditioning equipment.

J-M Decorative Floors—J-M Asphalt Tile or J-M Terraflex Plastic Tile, resilient floorings of outstanding beauty and durability, permit easy alteration and expansion of floor areas.

These building materials, described fully in the following pages, may be used independently or any two may be combined for a particular service. For complete details, consult a Johns-Manville sales office.

ACOUSTICAL MATERIALS

For 40 years, Johns-Manville has pioneered the development of acoustical materials and their proper application. Trained construction crews, under the supervision of competent acoustical engineers, insure that your project will receive the maximum in noise-quieting benefits.

Sanacoustic Units

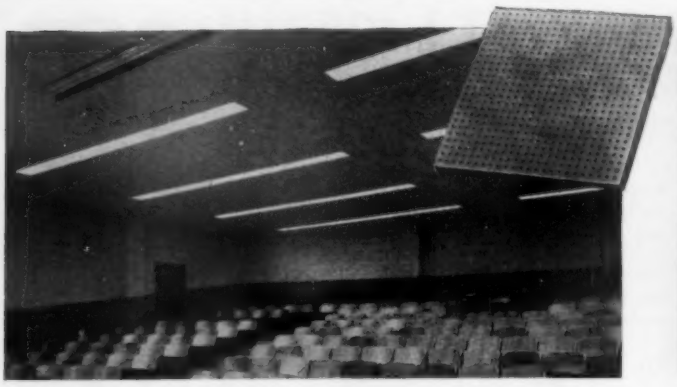
Description: Johns-Manville Sanacoustic® Units consist of perforated metal panels with a baked enamel finish containing a rock wool pad which serves as a highly efficient incombustible sound-absorbing medium. The units are held in place by special tee bars. Available in two types: Sanacoustic "S" and Sanacoustic "L." Both have equal acoustical efficiency but offer a choice in appearance.

Advantages: Composed of metal and mineral rock wool, Sanacoustic Units will not burn, rot or disintegrate. Their baked enamel finish is easy to keep clean and can be painted and repainted without loss of sound-absorbing efficiency.

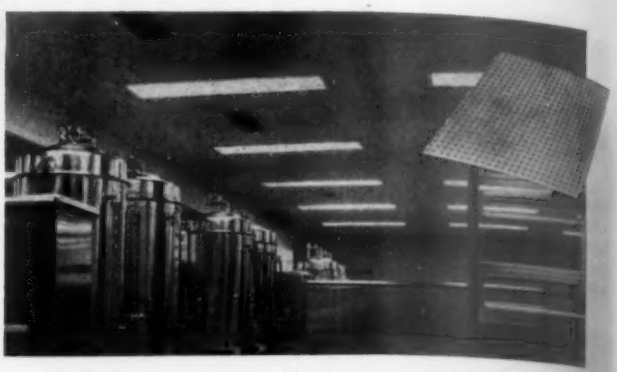
Application: Sanacoustic Units may be applied to existing ceilings or hung as a suspended ceiling from furring channels. In either case the Units are snapped into tee bars that are mechanically fastened to the surface to be treated. This assures perfect alignment and permits any part of the ceiling to be relocated without loss of materials.



The 50-50 Sanacoustic Pattern was designed for installations requiring modest acoustical efficiency at a modest price. This pattern consists of alternate perforated and unperforated Sanacoustic Units.



In this classroom at the State College, Raleigh, North Carolina, the ceiling was made acoustically efficient with J-M Fibretone.



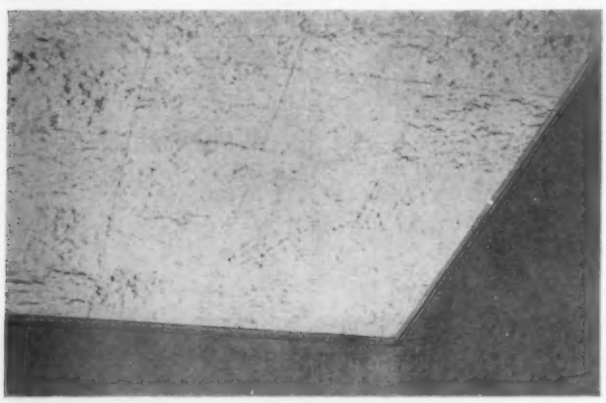
Transite Panels were selected for this school cafeteria ceiling because they provide a ceiling surface which is flat, level and unusually attractive.

Fibretone Units

Description: Johns-Manville Fibretone® Units are made of drilled fibreboard with perforations extending into the unit for maximum sound absorbing efficiency and repaintability. They are factory painted, give an attractive appearance and have a high degree of light reflection.

Advantages: Fibretone units can be easily installed at a cost which compares favorably with that of ordinary non-acoustical ceilings. They may be painted and repainted without loss in sound absorbing efficiency.

Application: Fibretone may be cemented to plaster, concrete, or plaster board ceilings, or mechanically fastened to wood furring; or directly to plaster board with screws or nails.



For many locations in schools and universities, such as conference rooms, executive offices, dining rooms, etc., the textured finish of Permacoustic is considered architecturally desirable.

Transite Acoustical Panels

Description: Johns-Manville Transite® Acoustical Panels consist of a perforated asbestos-cement Transite facing backed up with an incombustible rock wool sound absorbing element.

Advantages: These panels are particularly resistant to fire and excessive moisture and are ideal for school kitchens, cafeterias, gymnasiums, laboratories and swimming pools. They are also especially adapted for use in broadcasting studios, music rooms and auditoriums.

Application: The sound-absorbing element in Transite Acoustical Panels is installed between furring strips (wood or special metal) to which the Transite facing is fastened by nails and screws.

Permacoustic Units

Description: Johns-Manville Permacoustic® Tile is made of incombustible rock wool fibres held together with a binder in monolithic construction. Made with either square or beveled edges.

Advantages: In addition to its exceptional sound-absorbing properties, Permacoustic has two principal advantages: (1) its attractive appearance; and (2) its non-combustible fire-rating. Its two random-textured surface finishes—textured and fissured—provide design and decorative interest . . . give it high architectural acceptance.

Application: Installed with an adhesive to existing slabs or ceilings; or installed by means of a metal suspension system.

SIZES AND THICKNESSES OF J-M ACOUSTICAL MATERIALS

Type	Sizes, in.	Thickness, in.	Color
Sanacoustic	12 x 24	2½ (includes furring)	White
Fibretone	12 x 12, 12 x 24 12 x 12, 12 x 24, 24 x 24 12 x 12	½ ¾ 1	White
Transite Acoustical Panels	23⅞ x 23⅞, 24 x 24 23⅞ x 47¾, 24 x 48	3/16″ facing plus 1″ or 2″ thick sound-absorbing element	White and Natural Gray
Permacoustic	12 x 12, 12 x 24	¾	White

DECORATIVE FLOORINGS



The variety of colors and patterns of J-M Asphalt Tile make it suitable for school libraries, class rooms, corridors, auditoriums, etc.



Quiet under foot, J-M Terraflex is a fitting floor for this library. This restful flooring combines light reflection with quiet dignity.

J-M Asphalt Tile

Over 20 years of experience and use have established J-M Asphalt Tile as the standard for a durable, colorful low-cost flooring. The excellent service it gives with minimum upkeep makes it the most widely used floor covering for all types of commercial and institutional buildings.

Long-Wearing, Durable: Due to its large asbestos content, J-M Asphalt Tile maintains its durability, toughness, resistance to abrasion and fire year after year. It cannot rot or dry out.

Low in Cost, Easy to Maintain: The first cost of J-M Asphalt Tile is lower than that of other types of resilient floorings of the same thickness. Odorless and non-absorbing, it will not originate dust and is easily kept clean, attractive and sanitary with a minimum of maintenance expense.

Inviting and Attractive: Colors of unrivaled clarity are available in plain and marbleized shades that lend themselves to the design of any school interior.

Resilient Under Foot: J-M Asphalt Tile makes for quiet, comfortable foot traffic. Easy to walk and stand on, it is a safe floor because of its skid-resistant characteristics.

J-M Terraflex

J-M Terraflex® is an entirely new and different kind of flooring made of vinyl plastic and asbestos. It is the nearest approach to a universal, all-purpose flooring ever developed and is particularly suited to school floor service requirements.

Low Maintenance: Terraflex has a non-porous surface which assures a high degree of cleanliness with a minimum of care. It requires no hard scrubbing . . . a damp mopping usually keeps it shining clean. Its maintenance cost is one of the lowest in the resilient flooring field.

Long-Wearing: Although extremely resilient, Terraflex will outwear most other types of decorative floor coverings two to one. It is exceptionally tough and resistant to traffic.

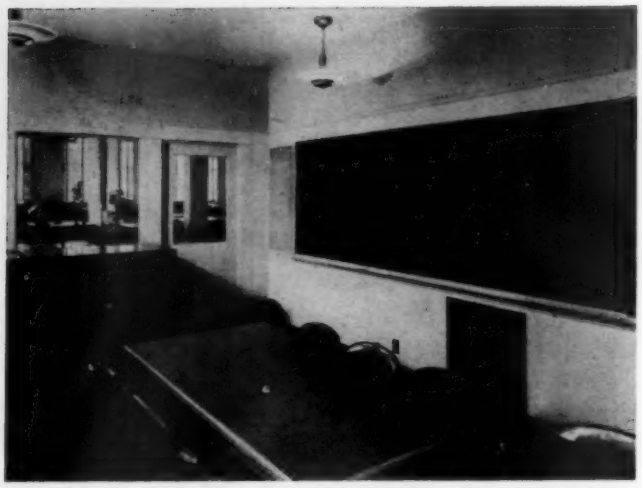
Beauty of Color and Design: Terraflex is available in a wide variety of clear, vivid, warm colors which keep their newness for the lifetime of the floor as the color goes all the way through each tile.

Unaffected by Strong Soaps: Terraflex cannot be harmed by strong soaps and caustic cleaning solutions . . . it cannot wash out. It defies spilled oils, greases and mild acids, and resists moisture and dampness.

SIZES, WEIGHTS AND THICKNESSES OF J-M FLOORINGS

Type	Standard Sizes, in.	Thickness, in.	Weight, lb per sq ft
Asphalt Tile	9 x 9	1/8	1.2
		3/16	1.8
Terraflex	9 x 9	1/16	2/3
		1/8	1.3

ASBESTOS MOVABLE WALLS



In this classroom at a western university, blackboards are an integral part of the movable partition. Cork boards, natural slate chalk boards, etc., are easily incorporated into Transite Wall construction.



Transite Walls are ideal for industrial and household arts areas. Hard to mar, sturdy, and permanent, they can be dismantled and relocated to meet changing needs at a minimum of time and expense.

Johns-Manville Asbestos Movable Walls provide the ideal solution to the problem of meeting the changing needs of classroom construction. These walls are easily erected and just as easily dismantled and re-erected with complete salvage of materials and a minimum of mechanical labor. At the same time, they possess the stability and appearance of permanent wall construction. The surfaces of the three types of J-M Movable Walls are flush and projection-free and will lend themselves to any decorative treatment. Space for wiring is provided within the partitions and is easily accessible.

J-M Universal Walls: These flush, moderate priced walls are widely accepted as a general use partitioning. The finished wall consists of a sealed core faced on both sides with asbestos-cement sheets and furnished as a complete wall section 1¾" thick. They may be left in their attractive, natural-gray finish or further decorated.

J-M Imperial Transite® Walls: Asbestos-cement panels that are fireproof, sound-resistant and long-wearing. Imperial Transite Walls may be painted, waxed or left in their natural finish. They are hung on patented steel studs to form a rigid, double-faced partition approximately 4" thick.

J-M Imperial Transitone Walls: A fireproof movable wall construction with integrally colored asbestos panels. The color goes all the way through each panel. It cannot chip or wear off which means lower maintenance expense and assures a partition that will stay permanently attractive. Light in weight, rugged and sturdy, Transitone is available from stock in light green or light tan. Erected in the same manner as Imperial Transite Walls.

For complete details on any J-M Asbestos Movable Wall construction, consult your nearest Johns-Manville sales office.

Built-up Roofing

Bonded for 10 years, the J-M Flexstone Built-Up Roof on the Poly Prep Country Day School, Brooklyn, N.Y. (pictured at right) was still going strong after 25 years of service! It is typical of the service provided by these better built-up roofs.

These roofs will not support combustion, are rotproof and durable, and need no periodic coating. Because they are smooth-surfaced, there is no excess weight of slag or gravel. Furthermore, maintenance costs are comparatively low. For complete details, write Johns-Manville.



FIR-TEX
PERFORATED
ACOUSTICAL TILE

WHEREVER
THE
control of sound
IS A FACTOR



FIR-TEX PERFORATED ACOUSTICAL TILE

FIR-TEX Perforated Acoustical Tile is made of strong, tough wood fibers, felted together and pressed into a rigid tile in such a way as to preserve the natural air cells within the fibers and add millions more sound-absorbing cells between fibers. Exposed surface is then perforated in a rectangular pattern. It is a finer material for sound control in hospitals, church classrooms, libraries, gyms, auditoriums, etc. Engineered for quick, low-cost installation and maintenance, FIR-TEX Perforated Acoustical Tile traps noise like a blotter soaks up ink.

THICKNESS — ½", ⅝", ¾" 1".

STANDARD SIZES — 12" x 12", 12" x 24" (scored to simulate 12" x 12" tile, or unscored), 16" x 16". Available in all thicknesses.

OPTIONAL SIZES — 16" x 32", 24" x 24" — both sizes in 1" thickness and with Firlock joint only.

JOINTS FOR STANDARD SIZES — All thicknesses available in butt joint. Thicknesses of ½" and 1" also available in Firlock joint. Thicknesses of ⅝", ¾" and 1" also available kerfed for splines or kerfed and cut back for mechanical suspension.

SOUND ABSORPTION — FIR-TEX Acoustical Tile is scientifically engineered to absorb reverberations and take the shock or impact out of noise. Note the following tests:

Material	Thick	Mount No.	125	250	500	1000	2000	4000	NRC	Unit Size Tested	Light Reflection Color	Light Reflection Value	Weight Lbs. per Sq. Ft.	Surface	Test No.
Fir-Tex Acoustical Tile	½"	#1	.08	.15	.64	.83	.79	.77	.60	12"x12"	White	.76	0.71	Painted Whitekote Flame-Resistant Finish	A52-343
Fir-Tex Acoustical Tile	½"	#2	.08	.42	.57	.75	.72	.75	.60	12"x12"	White	.76	0.71		A52-342
Fir-Tex Acoustical Tile	⅝"	#1	.06	.17	.69	.87	.78	.65	.65	12"x12"	White	.74	0.88		A52-345
Fir-Tex Acoustical Tile	⅝"	#2	.10	.49	.63	.84	.80	.76	.70	12"x12"	White	.74	0.88		A52-344
Fir-Tex Acoustical Tile	¾"	#1	.16	.32	.75	.86	.79	.46	.70	12"x12"	White	.77	1.10		A53-35
Fir-Tex Acoustical Tile	¾"	#2	.18	.65	.65	.84	.77	.51	.75	12"x12"	White	.77	1.10	Perforated 484 Holes per Sq. Ft. 11/64" Diameter	A53-34
Fir-Tex Acoustical Tile	¾"	#7	.48	.46	.57	.83	.89	.93	.70	12"x12"	White	.77	1.10		A53-33
Fir-Tex Acoustical Tile	1"	#1	.06	.34	.81	.93	.77	.63	.70	12"x12"	White	.72	1.54		A52-351
Fir-Tex Acoustical Tile	1"	#2	.22	.61	.70	.86	.74	.57	.75	12"x12"	White	.72	1.54		A52-350
Fir-Tex Acoustical Tile	1"	#7	.48	.47	.73	.84	.79	.60	.70	12"x12"	White	.72	1.54		A52-349

FLAME-RESISTANT FINISH — Fir-Tex Perforated Acoustical Tile is factory finished in flame-resistant Whitekote, meeting the requirements of Fed.-Spec. —SS-A-118a-Class C. It can also be furnished with WASHABLE flame-resistant Whitekote finish. Both these finishes are designed to insure maximum light diffusion and attractiveness.

MOISTURE-RESISTANT — Its strong, tough fibers have been sterilized and integrally treated, making the tile highly resistant to moisture and buckling under normal atmospheric conditions.

PROCESSED TO RESIST TERMITES — Subjected to the exclusive FIR-TEX process as a protection against termites. This protection is permanent and odorless.

BORDERS — Border units of the same material without the perforations are available, thus permitting an attractive pattern to be achieved.

NEW Casual PATTERN FIR-TEX PERFORATED TILE



The perforations in this new Fir-Tex product are pleasingly disarranged so as to provide a tile distinctive in appearance. The entire room has character with no apparent pattern for distraction. The holes all are the same size with the disarrangements minimizing the joints. Fir-Tex Casual pattern perforated tile is available only in 12"x12" in all thicknesses and the joints for all thicknesses as stated above.





HUSHES NERVE-GRATING NOISE

...Wherever the control of sound is a factor

FIR-TEX Acoustical Tile is the ideal material for the architect to use when he wishes to beautify and also control sound within a room. It is scientifically engineered to absorb reverberation and take shock or impact out of noise. This material should be applied only by experienced applicators who are thoroughly familiar with the use of acoustical tile.















APPLICATION INSTRUCTIONS FOR FIR-TEX PERFORATED ACOUSTICAL TILE

Fir-Tex Tile may be secured directly to a level, brown coat plaster surface, concrete, or gypsum board base, using an approved acoustical adhesive. The usual procedure is to apply four (4) spots of the adhesive cement to each 12"x 12" Fir-Tex Tile unit. Each spot should approximate the size of an English walnut, and after placing the tile in position by lateral movement under pressure, the contact area on the surface should be from 2" to 2½" in diameter.



Ceiling surfaces must be cleansed of all dust, dirt, loose paint, etc., and be true and level, of sufficient strength to support the acoustical tile. For a satisfactory installation, care must be taken so that the solid surface on which units are to be placed is completely suitable for this method of application.

Moisture is the greatest enemy of all adhesive cements. Under no conditions should Fir-Tex units be applied to a ceiling freshly plastered, or new concrete, which may contain any degree of dampness. On newly plastered ceilings, or new concrete surfaces, it is advisable to apply a wash coat of glue size; a stain may be added to the glue size to make sure that the entire surface has been treated.

The Fir-Tex Tile should be applied in straight lines and laid out so as to have borders of equal width on opposite sides of each area. The border units shall be unperforated, and shall not be less than 4" nor more than 12" wide. Where acoustical treatments intersect walls, ducts, columns, etc., place a cove moulding securely nailed or cemented in position, or, if preferred, the Fir-Tex Border Tile may be scribed and fitted neatly against a butting surface without the use of suitable moulding.

Furring and Nailing

Fir-Tex Tile may be attached by nailing to wood strips. These strips may be secured directly through old plaster ceilings in approved manner. 1"x 3" wood furring strips are placed 12" on centers, and shimmed to provide a level nailing surface.

Fir-Tex Perforated Tile 12"x 12" and 12"x 24", is made with specially drilled holes for nailing application. Kollar nails providing concealed nailing may be used. In some instances screws are used in place of nails for securing the tile to the furring strips.

On new constructions, where a suspended ceiling is used to conceal pipes, conduits, ducts, or beams, a special system of mechanical suspension, consisting of T's and splines, may be used to support the Fir-Tex Perforated Tile in position. ⅝", ¾" and 1" Fir-Tex Tile are furnished kerfed and cut back to fit the suspension system. The non-perforated Fir-Tex Border Tile may be used with this system, in the same manner as mentioned above.

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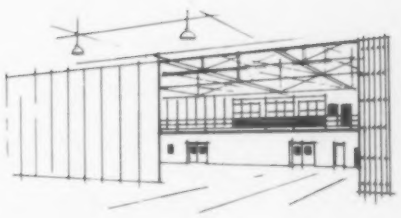
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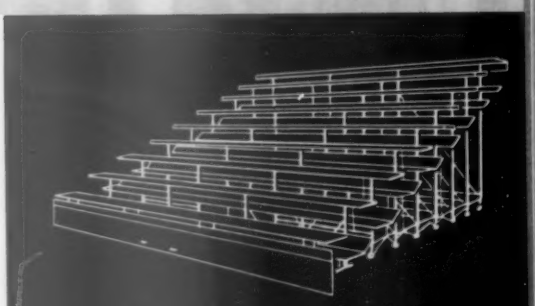
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designed to give you...

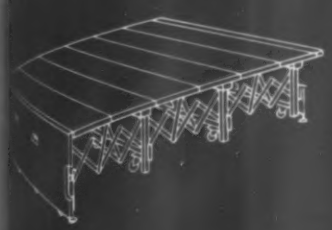
MORE USE AT LESS COST!



FOLDING PARTITIONS



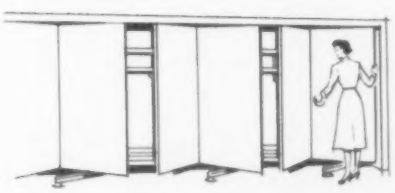
FOLDING GYM SEATS



FOLDING STAGES

by **Horn**

- FOLDING STAGES
- FOLDING GYM SEATS
- FOLDING PARTITIONS
- FOLDING WARDROBES



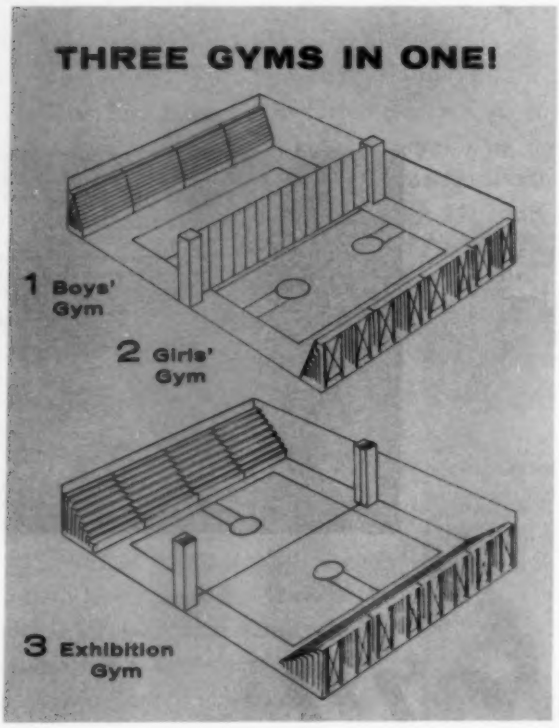
FOLDING WARDROBES



HORN DIVISION, THE BRUNSWICK-BALKE-COLLENDER COMPANY

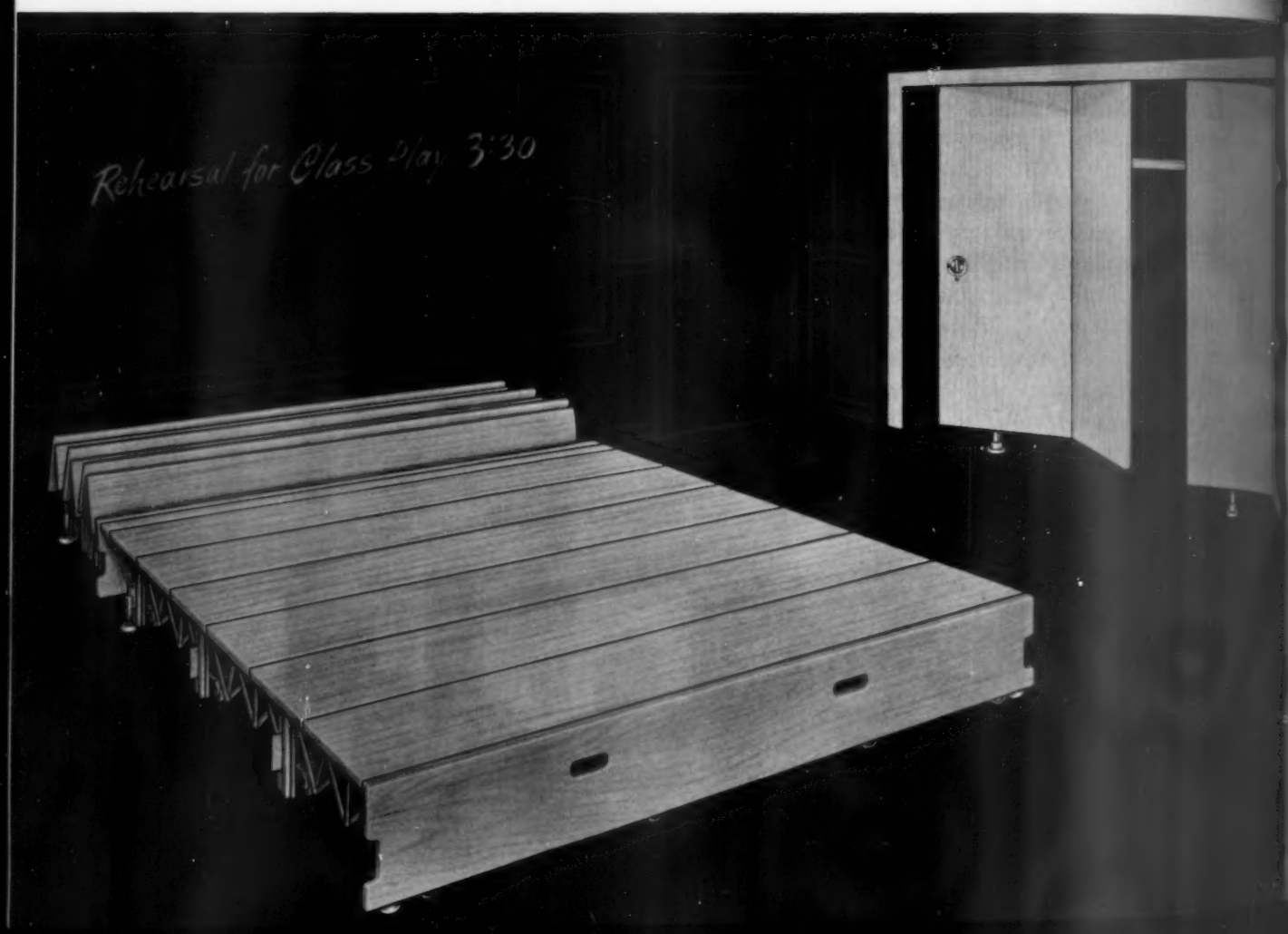
MARION, VIRGINIA

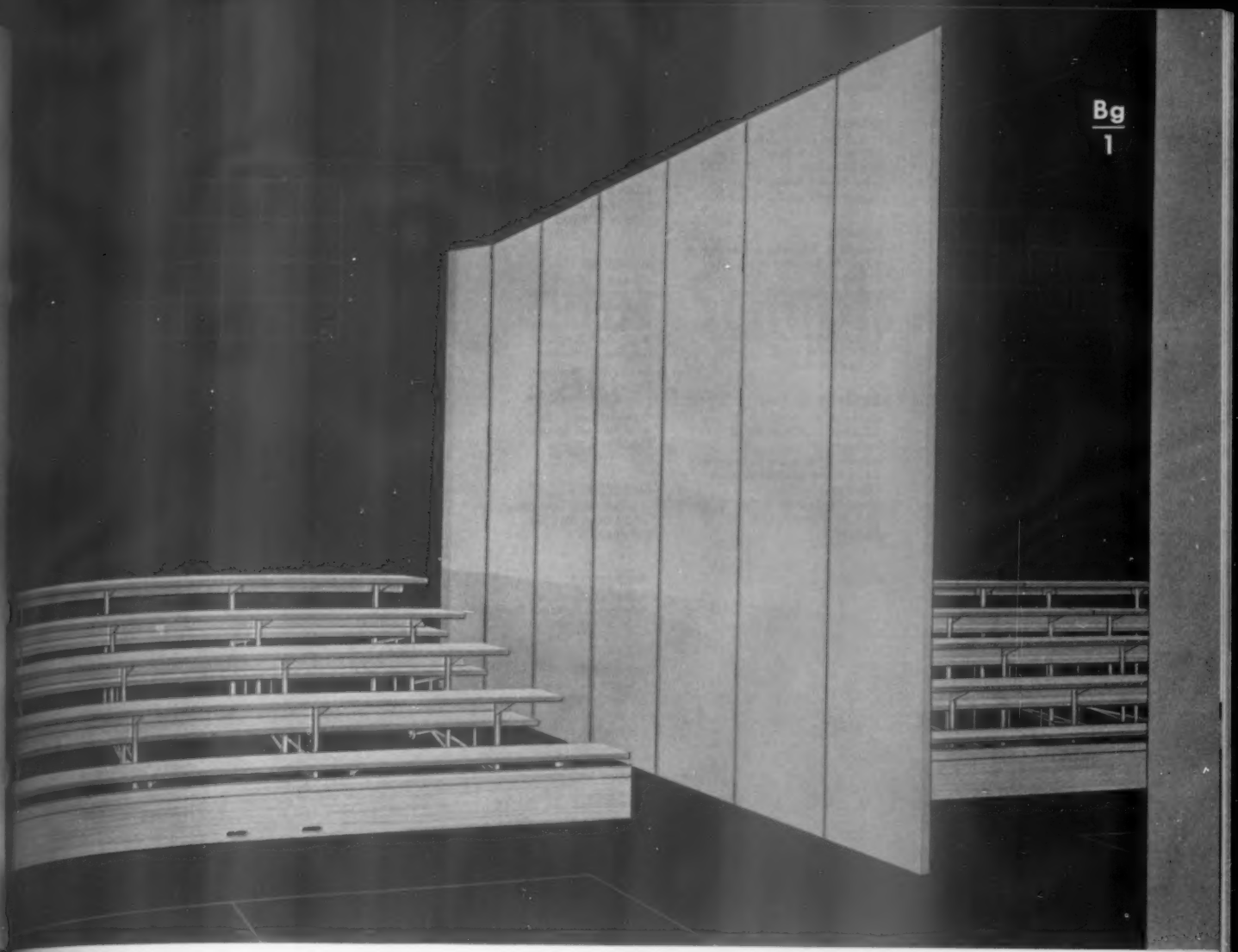
Triple Your Gym Facilities with Horn Folding Partitions and Folding Gym Seats



HORN FOLDING PARTITIONS give you the maximum use from your gym space at a minimum of investment! Instead of building separate gyms, you build only one, equipping it with a Horn Folding Partition. Close the partition and you have *two separate* gyms for boys' and girls' classes...open the partition and you have a large exhibition gym—*three* gyms from the space of *one*! You get more use from classroom space too, with Horn Folding Partitions. Use them in your cafeteria, library, multi-purpose rooms—wherever you want to divide activities at will! Whether you specify automatic electric, mechanical or manual operation, every partition is custom-engineered to your specifications...custom-installed by factory mechanics to assure the utmost in service and performance.

HORN FOLDING GYM SEATS are perfect partners to Horn Folding Partitions for getting the most from your gym space. Close the partition and fold the gym seats against the wall (you'll be surprised how little space they use) and you have plenty of room in each practice gym. Open the partition and extend the gym seats and you have an exhibition gym with plenty of revenue-producing seating. The full chair height of the gym seats provides maximum seating comfort to spectators, and there's plenty of leg room so that "late arrivals" can slip in easily. Each row of gym seats locks automatically when unfolded, assuring the utmost in safety. When folded the seats provide safety too, for they present a smooth, sloping surface, free of sharp or protruding edges.





Get the Most Out of Your Rooms with Horn Folding Stages and Folding Wardrobes!

HORN FOLDING STAGES are real work-savers! With little effort any room can become a theater within minutes. You simply roll a Horn Folding Stage into position, secure it in place by a few quick turns of the rubber-tipped floor stops, and it's ready for use. When finished, release the floor stops, fold the stage, and roll it away–freeing the floor space for other classroom uses. No storage problem either, for the stage folds into a compact bundle that requires little space. Its sturdy steel understructure and floor of select, vertical-grained fir makes the Horn Stage a strong, durable unit that will withstand the hardest use. Your choice of two heights and a variety of standard sizes that will solve any problem.

HORN FOLDING WARDROBES are designed to meet the modern trend toward functional classroom planning. Open the doors and you have generous wardrobe and storage space...close them and you have a chalkboard or bulletin board. Quiet, effortless operation is yours for many years, for Horn Wardrobes feature operating hardware of new, advanced design. Doors keep in perfect alignment because they're adjustable in all directions, may be latched open or closed to prevent unauthorized movement. Horn offers you three types of open-close operation, each with doors that move singly or all together. The most complete line of classroom wardrobes available. And each unit is designed and constructed to your requirements!

It is completely portable! Swivel-mounted, non-marring, ball-bearing wheels make it possible to wheel the stage from classroom to classroom with ease—set it up wherever you need it!



For more detailed information on **Horn products** write for individual product brochures. They're yours on request at no cost and without obligation.

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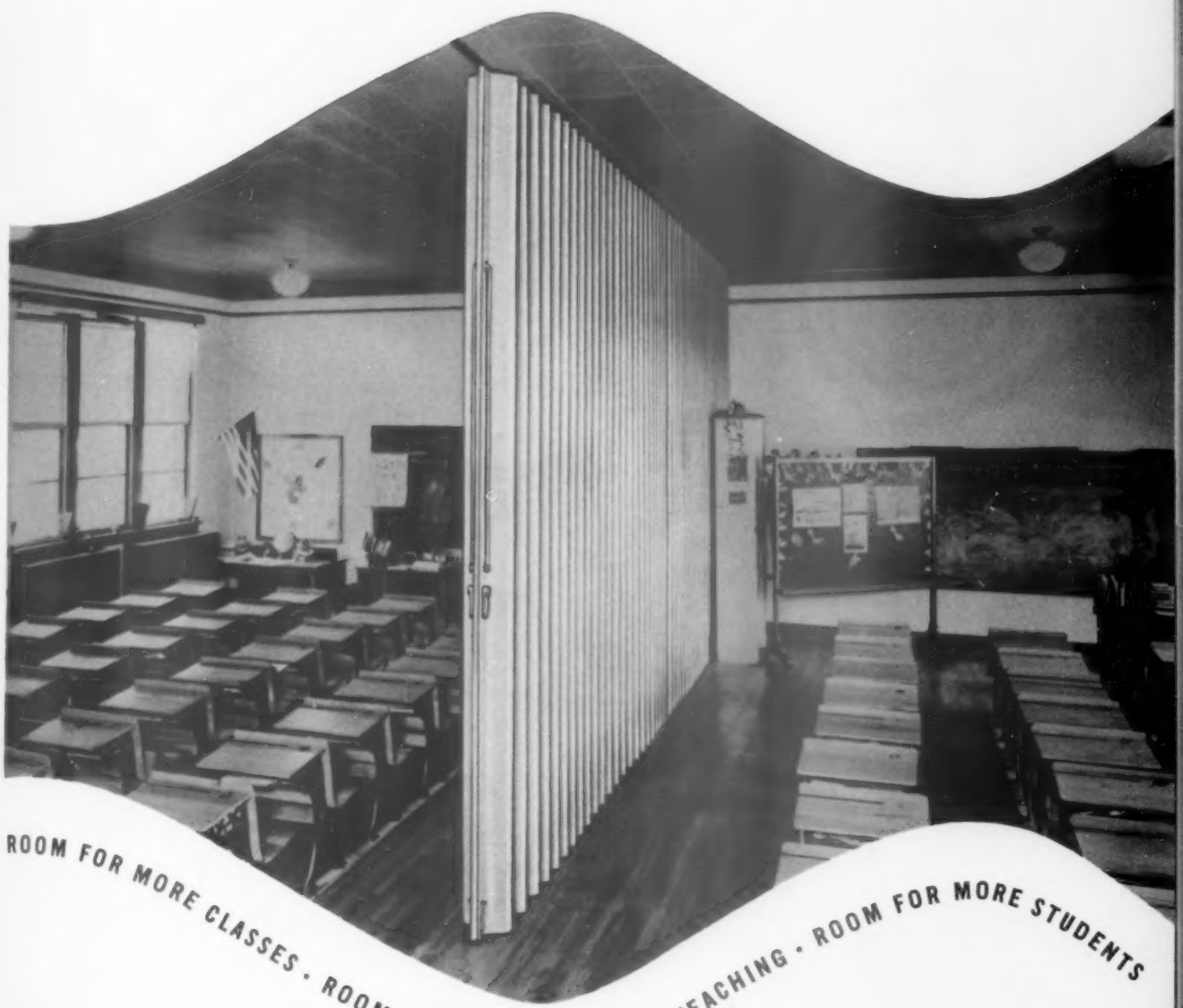


the doors that fold
like an accordion

modernfold®
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for Schools...

offer new economical solutions for better utilizing your present floor space



ROOM FOR MORE CLASSES · ROOM FOR MORE EFFECTIVE TEACHING · ROOM FOR MORE STUDENTS

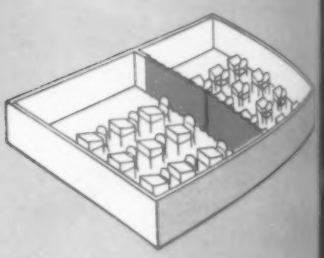
Modernfold Doors add more space— more convenience to Today's Schools



The Modernfold Door is a folding closure . . . with an accordion-like action in opening and closing.

School executives and architects all over the country prefer Modernfold because of its commanding beauty, its elimination of the need for door swing area, its ingenious use as a room divider, its trouble-free operation, and the great savings it provides on partition and closure construction costs.

The double-strength metal-framed construction to which the washable vinyl-coated fabrics are attached gives Modernfold its great strength and rigidity. Available in sizes to fit any opening, Modernfold requires no floor track . . . is easy to install.

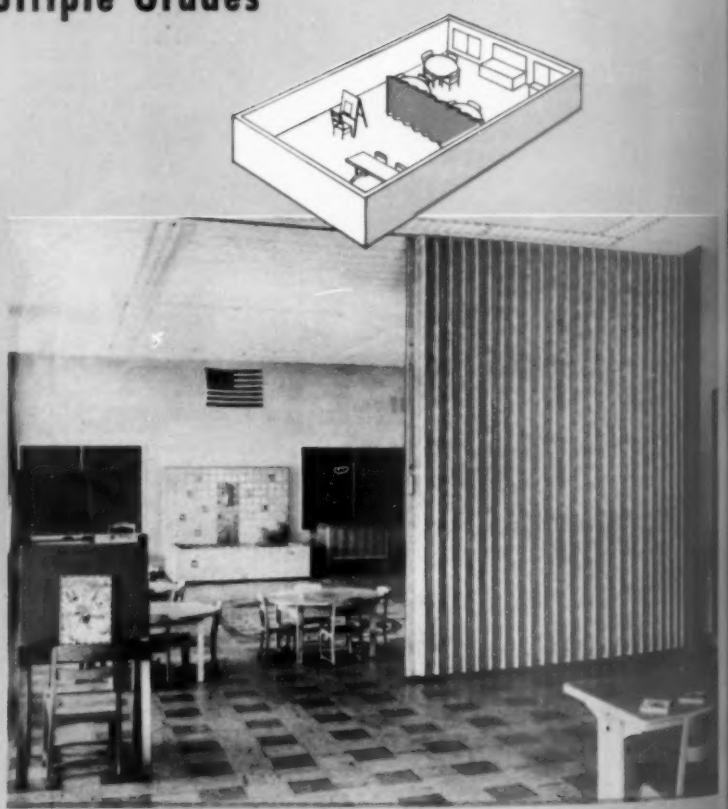


school room division for Multiple Grades

Most schools built today incorporate new ideas for multiple space utility. But those schools built years ago, must accommodate more students with existing space. It becomes necessary to divide one room so that it may serve as two or more.

This modern school uses a large Modernfold Door as a "folding wall." Closed, it assures absolute privacy, with no disturbance to either classroom group. Folded back against the wall, unobtrusive Modernfold makes the entire area again available for joint classroom activity.

Modernfolds, used singly or as pairs, reduce sound transmission. They can be furnished with further sound-reducing characteristics without any changes in their design or appearance.



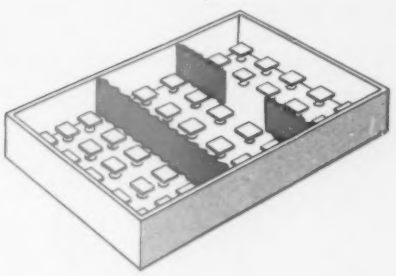
double duty rooms • LUNCH ROOM and STUDY HALL or CLASS ROOMS



Modernfold functions efficiently in school lunch rooms where the division of a large lunch room into several smaller units creates separate areas for private study, class rooms or other activities.

With Modernfold shutting off kitchen sounds from the dining area, kitchen personnel and students can work without disturbance.

Modernfold operates with just a touch, and lasts a lifetime . . . easy to clean, just use soap and water.



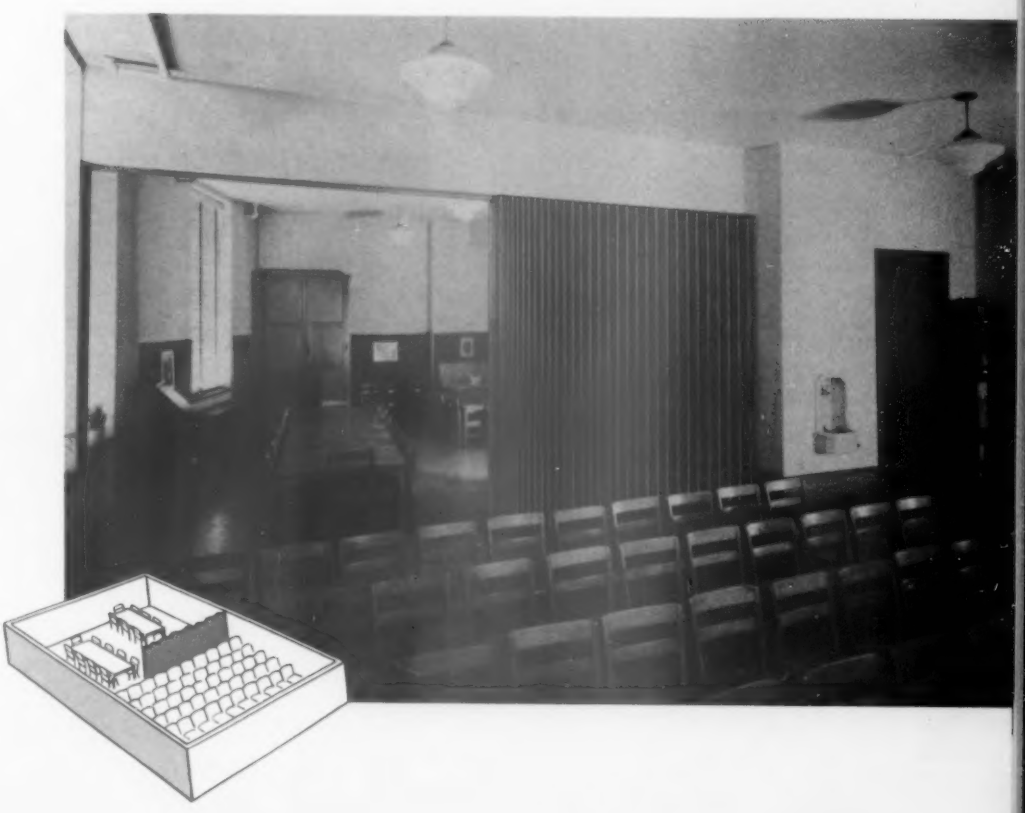
SCHOOL ROOM DIVISION for Audio-Visual teaching

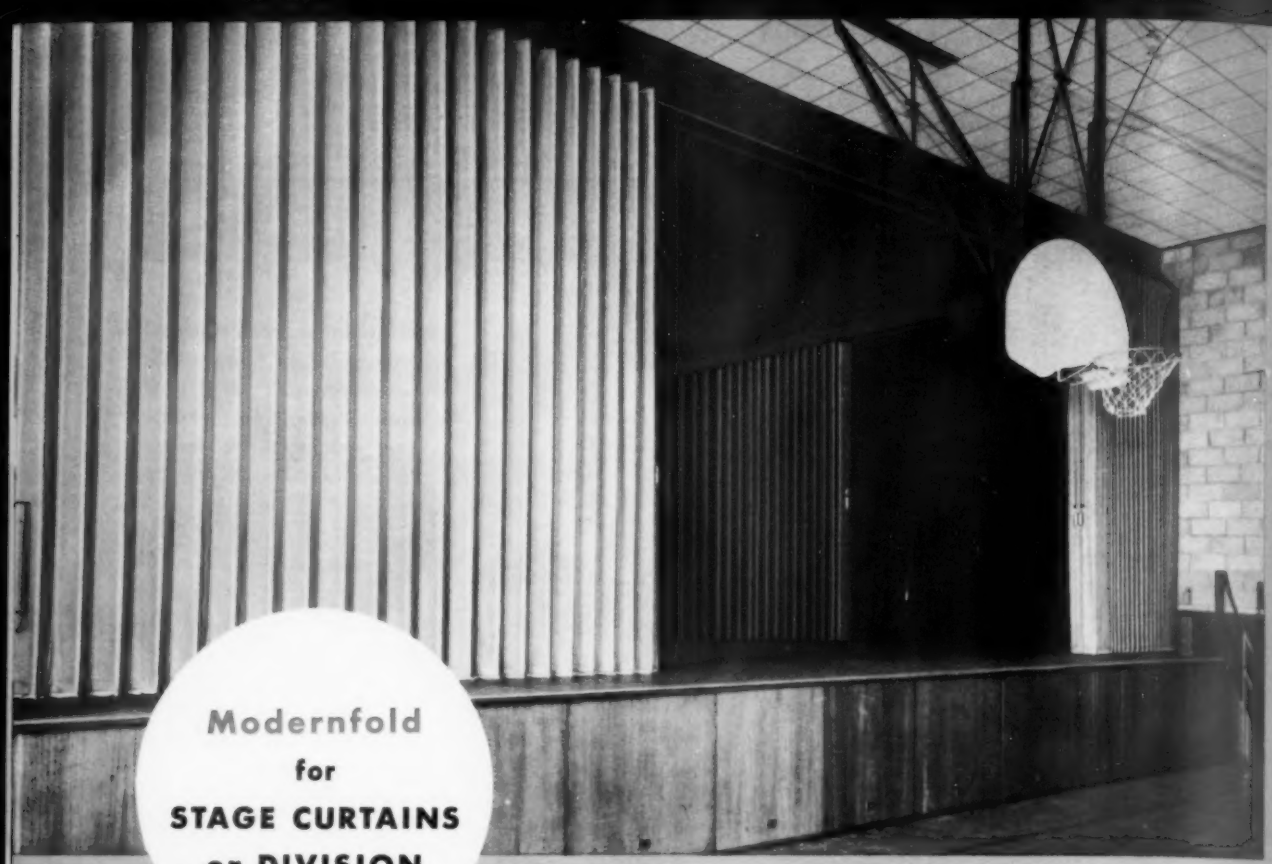
Because of the proven value of audio-visual teaching, these tools for better learning have earned for themselves a place in most of today's schools.

Modernfold, which serves as a folding wall, works wonders in this school. The Modernfold "folding partition" closes off the auditorium from the classroom, when audio-visual training is being employed. The classroom in the rear of the photograph can continue with its regular activities undisturbed.

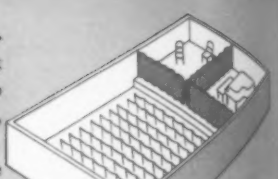
Modernfold makes it possible to convert one classroom into two—for study purposes, small group instruction.

Modernfold molds the classroom around present-day teaching requirements.





Modernfold for STAGE CURTAINS or DIVISION



In many schools, Modernfold has replaced stage curtains. Beautiful Modernfold, with its graceful, vertical folds, is flame resistant . . . easily washed with soap and water. Modernfold puts an end to costly drapery maintenance and cleaning, eliminates tangled, drooping overhead cords.

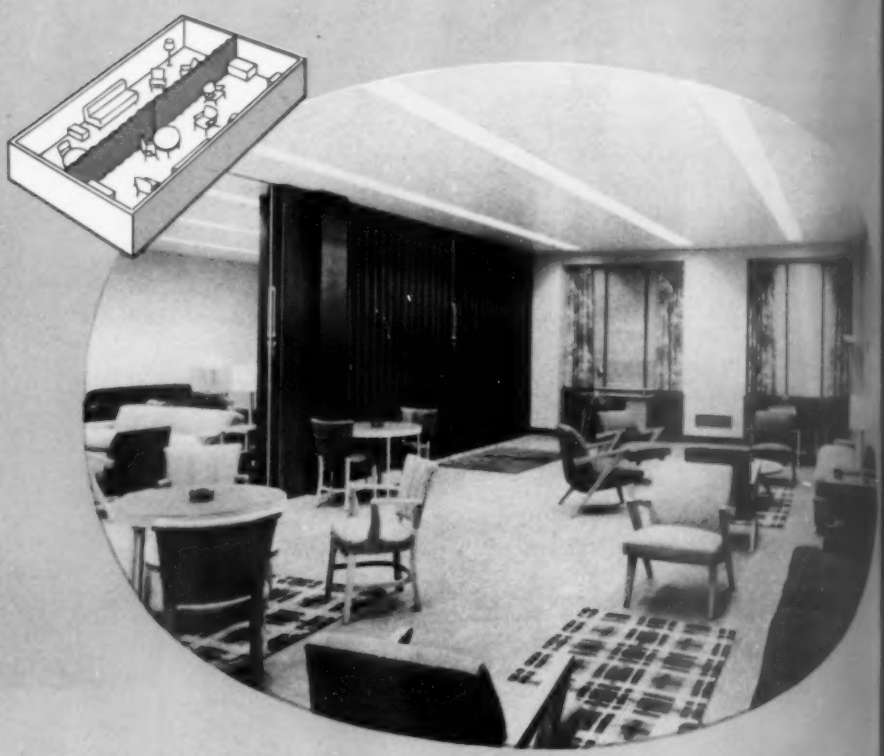
We recommend electric or crank operated Modernfold for stage use. And it is economical to cover only the side facing the auditorium with fabric; the back-side can be covered with canvas.

Additional Modernfolds used on the stage provide better control over rehearsal groups.

MODERNFOLD PROVIDES THE ANSWER TO SPACE DIVISION PROBLEMS

In faculty lounges—and in dormitory and student union building recreational areas as well . . . Modernfold Doors represent a flexible solution to all problems of partition, closure and privacy. For with Modernfolds, one room can be converted into two or more, yet the full use of the entire floor space can be enjoyed simply by pushing them back to the walls.

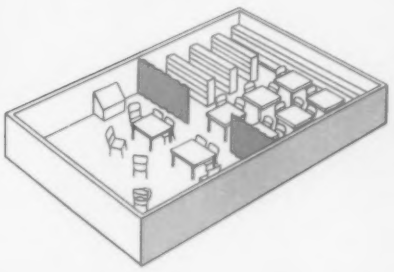
Lovely Modernfolds enhance decorative schemes and harmonize with any furnishings.





DOUBLE-DUTY LIBRARIES

Library? Study hall? Classroom? Suit the room to the need with Modernfold! Much-needed classrooms can be "built" in the library by using Modernfold—with none of the high costs and inconvenience of new construction.



BUILT-IN wardrobes and closets



A Modernfold wardrobe provides superior accommodations for clothing and personal articles of school children and teachers. Modernfold's folding action makes every square foot of wardrobe area accessible—permits full use of all room floor area.

No maintenance worries because Modernfold ... available in eye-pleasing colors . . . is steel-framed for durability and covered with washable vinyl coated fabric.

Modernfold operates silently in a ceiling track, eliminates the clatter of metal lockers, the banging of folding and sliding wood doors . . . solves the vexing problem of hurt, pinched fingers.

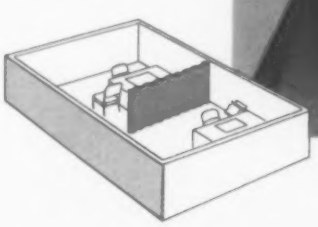
MODERNFOLD serves many needs in the school office



In school offices, as in business offices, Modernfold eliminates the wasteful swing area of hinged doors which obstruct passageway, interfere with furniture placement. The space they waste becomes usable with Modernfold, which folds upon itself.

Modernfold Doors provide privacy when needed and find extra space without increasing floor area. They close off rooms where wall space is at a premium . . . make space work more economically than out-moded swinging doors.

Modernfolds create conference rooms, wall off files and equipment areas, yet make them easily accessible.





HEALTH UNITS

Privacy when required . . . flexible use of existing space . . . are most important in the health unit.

Modernfold means privacy for those who use the facilities of the treatment rooms—privacy for the nurses and doctors.

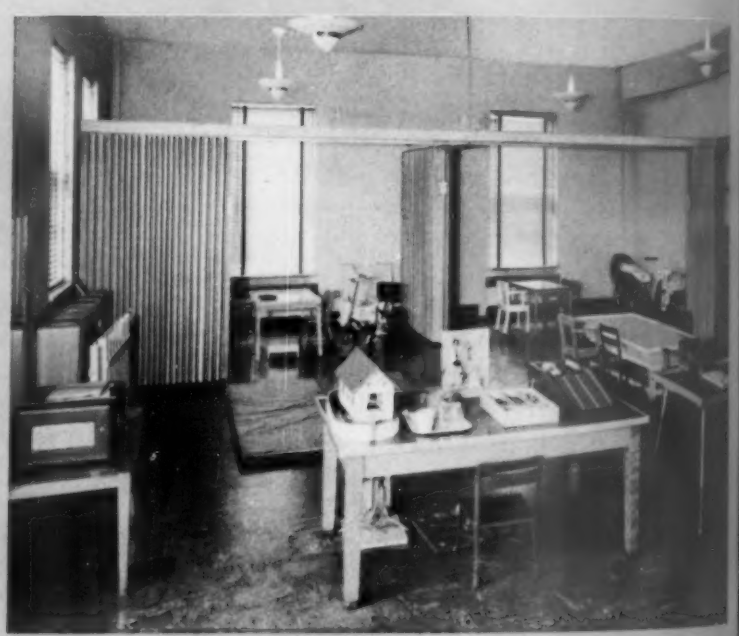
Modernfold is a separation for wards . . . a closure for the X-ray room . . . a partition to separate the reception office a the record office from the treatment rooms.

Remember, Modernfold is a "folding wall"—for sub dividing space or for consolidating it.

separate activities . . . separate rooms

The curative workshop shown at right uses Modernfolds to create three rooms out of one large area. Different activities may be carried out by separate groups without disturbing the projects of the other students.

Modernfold's versatility may be utilized without costly remodeling, or expensive construction.

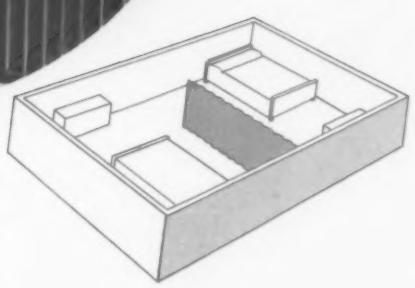


more comfortable living—STUDENT or FACULTY LIVING QUARTERS



To the average student whose living space seldom exceeds 150 square feet, Modernfold means more comfortable living . . . more usable floor and wall space . . . better decoration and furniture placement . . . because Modernfold saves all the space swinging doors waste.

As a folding wall, beautiful Modernfold provides privacy when needed . . . makes two bedrooms out of one! Modernfold brings home-like atmosphere to campus recreational facilities—makes them more enjoyable to students.



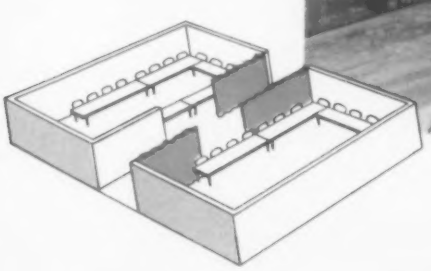
MODERNFOLDS CREATE FLEXIBLE SPACE TO MEET CHANGING NEEDS

Permanent hallways represent loss of control over use of available space.

This modern school gets more use from its floor space by using Modernfold Doors to change hallway space into classroom space when needed.

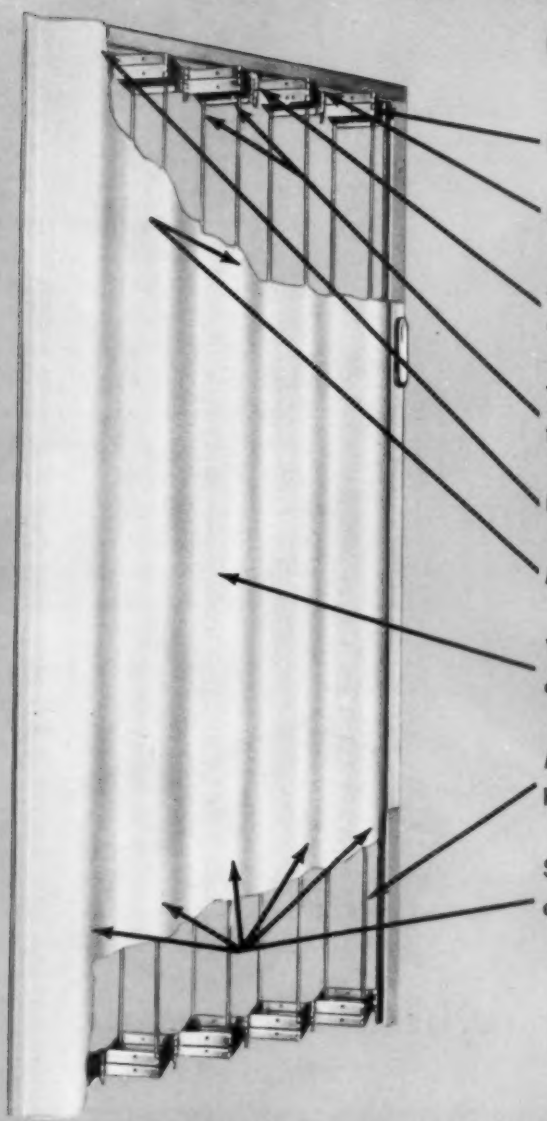
Closed, Modernfolds provide privacy for two separate classrooms leaving a hallway between for access to the shop. Yet, Modernfolds open at a touch to make whole area available for evening group meetings or adult education classes where larger rooms are required.





only modernfold® DOORS

offer all these advantages!



- Positive action catch-spring keeps door closed—always.
- Sturdy steel track; four types available.
- Adjustable trolleys attached at hinge intersection for easier operation.
- True, balanced double-frame hinge construction at both top and bottom.
- Fabric hides hinges, track and trolleys. No cornice needed.
- More insulating air space between door sides.
- Washable vinyl-coated fabric covering in a wide range of colors.
- More vertical steel rods, welded . . . not crimped . . . to hinges.
- Same number of projecting folds on both sides. Perfectly centered between jambs.

38 colors
to match any color scheme

YOUR MODERNFOLD DISTRIBUTOR WILL HELP WITH ANY PROBLEM

For full information on Modernfold Doors, contact our installing distributor nearest you. Strategically located across the nation, they are thoroughly conversant with closure and partition problems. Their function is to show you where Modernfold can save space, provide greater space flexibility or present the solution to a troublesome closure problem. They are ready to give you prompt service and delivery, and complete the installation on Modernfold, the accordion-type door.

No matter what your closure or partition problem may be, there is a Modernfold to provide the solution. Sound insulated doors, curved doors and switch types can be supplied. While most doors are manually operated, mechanical doors, electrical or hand crank operated, are available.

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FORM NO. 164 B

PRINTED IN U.S.A.

THE CELOTEX CORPORATION

120 S. LaSalle St., Chicago 3, Illinois



George Washington School, Park Ridge, Illinois

NOISE: The problem that makes problem students

When noise is present . . . tendencies toward good study habits, concentration, clear thinking are *absent.* Day-to-day classroom routine noise induces tension and fatigue, retards distinct hearing, aggravates need for discipline. Both teacher and pupils are harassed, handicapped, helpless victims.

Economical Answer

To hundreds of American schools, however, has come this budget-easy solution: Acousti-Celotex Sound Conditioning! A sound-absorbing ceiling of Acousti-Celotex Tile . . . to check noise, create favorable-hearing conditions. In classrooms, libraries, study halls, band rooms, music rooms, corridors, gyms and cafeterias . . . Acousti-Celotex *soaks up* disturbing sounds, brings *restful quiet.* And *everyone benefits!*

Easy to Maintain

Quickly installed, Acousti-Celotex Tile requires no special maintenance. It provides excellent sound absorption plus a surface of remarkable beauty that can be washed *repeatedly* and painted *repeatedly* with no loss of sound-absorbing efficiency!

Write today for a Sound Conditioning Survey Chart that will bring you a *free analysis* of the noise and acoustical problems in your school, plus a free factual booklet, "Sound Conditioning for Schools and Colleges." No obligation!

Products for Every Sound Conditioning Problem:
The Celotex Corporation, 120 S. La Salle St., Chicago 3, Illinois
In Canada: Dominion Sound Equipments, Ltd., Montreal, Quebec.

TRADE MARK

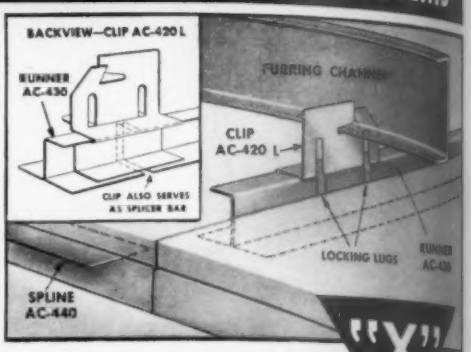
ACOUSTI-CELOTEX
REGISTERED U. S. PAT. OFF.
Sound Conditioning

LOXIT SYSTEMS, INC.

1217 W. Washington Blvd., Chicago 7, Illinois

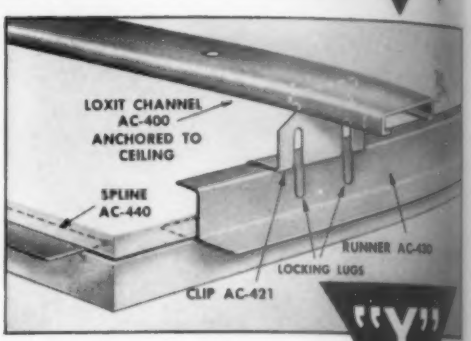
THE "XYZ" OF DEPENDABLE ACOUSTICAL SUSPENSION SYSTEMS

The new improved Loxit VICTORY Acoustical Suspension System is really three systems in one—"X" Regular—"Y" Surface Applied—and "Z" Combination. Used individually or in combination, this system meets *every* acoustical tile-setting condition. Type "X", shown at the right, was engineered to care for conditions where furring channels are being used as the supporting structural members for the suspension system. It is simple and easy to use.



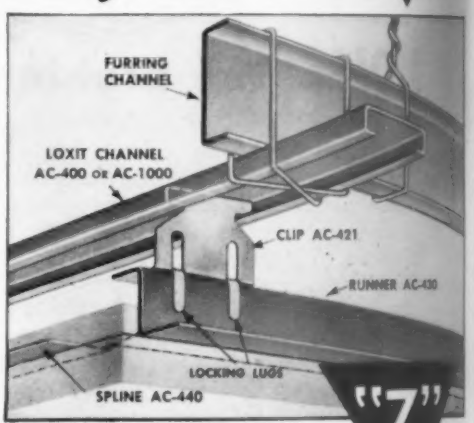
LOXIT *Victory Regular System* TYPE "X"

Type "Y" at the right illustrates how the Loxit Victory Surface Applied Acoustical Suspension System was designed to meet those conditions where no suspension is involved, with the tiles being applied directly to the ceiling. Using Loxit channels AC-400 with Loxit clips AC-421, this type of installation becomes both simple and practical. Using ¾" tiles, the overall dimension from ceiling to face of tile is only 2-3/16".



LOXIT *Victory Surface Applied System* TYPE "Y"

Type "Z" shown here is the Loxit Victory Combination Acoustical Suspension System which embraces both Type "X" and Type "Y" and provides facilities for leveling the suspension members of the system by shimming between the Loxit channels AC-400 or AC-1000 and the furring channels, bar joists or other structural sections. The Loxit channels serve to tie together the supporting members to add greater stability to the suspension structure as a whole. Because of its flexibility, Type "Z" can often be used to great advantage.



LOXIT *Victory Combination System* TYPE "Z"

5 IMPORTANT MECHANICAL ADVANTAGES . . .

- Since clip AC-420 was designed to fit the bottom flange of cold rolled furring channels, only one clip is required regardless of size of channel.
- The clip fits the channel tightly because the groove of the clip and the locking lugs are both beveled.
- Clips AC-420 being right and left and clips AC-421 being reversible as well as the runners AC-430, right and left conditions are automatically provided for.
- Both AC-420 and AC-421 clips can be used as splices for runner AC-430—eliminating separate splicing clips.
- The runner's supporting flanges are single thicknesses of metal on both sides (the same thickness as the splines), reducing the thickness of the kerf in the tiles to that of a single thin saw blade, automatically assuring proper alignment of acoustical tiles.

Consult your architect—he can save you money, time, and trouble.

WOOD CONVERSION COMPANY

Dept. 116-44, First National Bank Bldg., St. Paul 1, Minnesota



Multiple-purpose ceilings for schoolrooms

NU-WOOD interior finish tiles decorate, insulate and hush noise—all in one product and at one low cost. Nu-Wood is ideal for new construction as well as for school remodeling. Nu-Wood goes up quickly, ends painting maintenance and unsightly ceiling cracks. Tile colors are Sta-Lite white—with 76% light reflection—and Kolor-Fast in warm, variegated tan tones.

Nu-Wood Acoustical Tile—Nu-Wood Acoustical Tile is widely used where maximum classroom noise control is desired. Excessive room noises are reduced to a minimum since each tile contains thousands of sound deadening cells. Acoustical Tiles are pre-decorated in Sta-Lite and Kolor-Fast tones.

*Reg. U. S. Pat. Off.

Nu-Wood Tongue-and-Groove Tile—Applied with the famous Nu-Wood clip system, these tongue-and-groove tiles overcome most nailing base irregularities, providing a "floating" ceiling that is level.

Nu-Wood Wide Flange Tile—This Tile has a sturdy flange joint which permits application with a staple gun or nails.

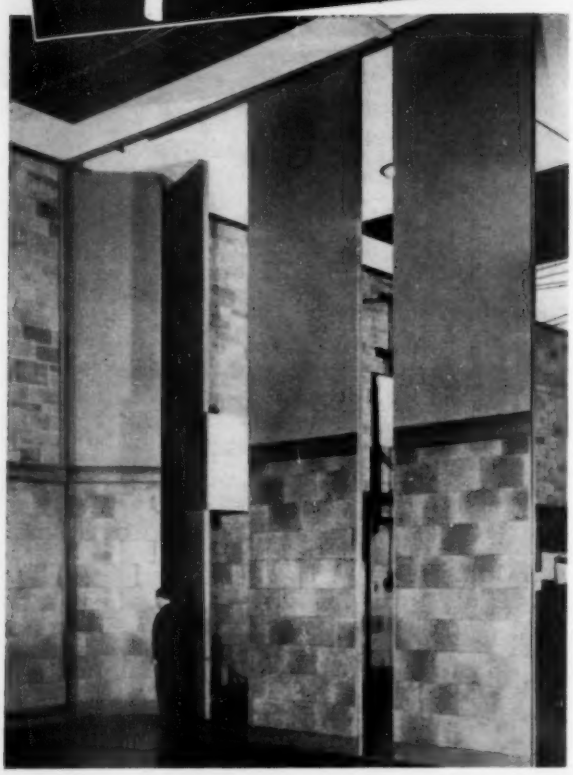
Adhestik Application—All Nu-Wood Tile may be applied with a special adhesive to existing ceilings that are sound, where high light reflection, extra insulation and noise reduction are desired.

NU-WOOD* ACOUSTICAL TILE

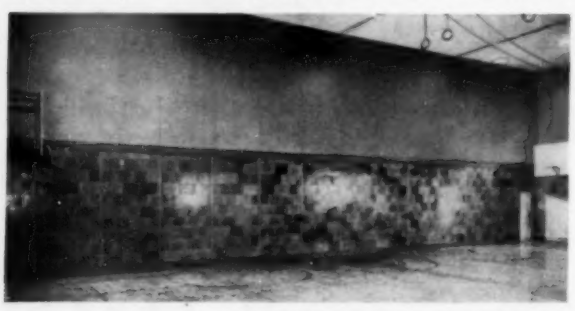
JOHN T. FAIRHURST CO., INC.

45 West 45th Street, New York 36, N. Y.

Fairhurst
TRADEMARK



This gymnasium wall at Riverhead High School, Riverhead, N.Y., has given trouble-free service for 16 years. 14 units, each 3' wide, 22' high, are shown (above) being folded easily by one man, without the need for mechanical power. Wm. I. LaFon, II, Architect.



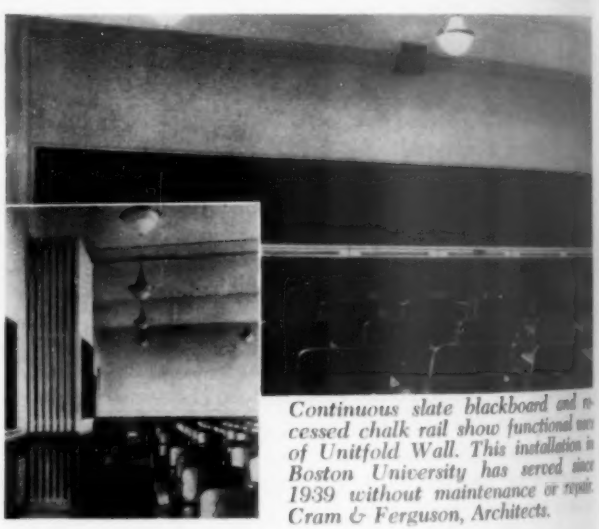
Representative Users of Fairhurst Folding Walls: St. Peter's School, Yonkers; Wellesley College; Camp Curtin Jr. High School, Harrisburg, Pa.; Michigan State College; St. Mary Magdalene School, L.I., N.Y.; Will Rogers School, Shawnee, Okla.; Windsor Locks School, Windsor Locks, Conn.; Stevens School, Stamford, Conn.; Rensselaer Polytechnic Institute, Troy, N.Y.; State Teacher's College, New Paltz, N.Y.; Princeton University; Central Ave. School, Naugatuck, Conn.; Fremont Union High School, Sunnyvale, Calif.; Elizabeth Seton School, Yonkers, N.Y.; Student Union Bldg., State College, Pa.; Sedgwick County School, Wichita, Kansas; St. Vincent Ferrer School, New York; Wharton School (University of Pennsylvania).

FOLDING WALLS

Double the efficiency of Room Space . . . . .

The usefulness of room space may be doubled or even tripled by the use of Fairhurst Unitfold® and Unitslide® Walls. School and college management has found Fairhurst Folding Walls a most effective and economical solution to the growing need of additional space.

None of these features is available except in FAIRHURST FOLDING WALLS: • No visible hardware, permitting complete harmony of decoration. Rigidity is obtained without the use of bolts or hinges. • Highest sound retardance ever attained in a movable closure—equal to solid wall construction. • Automatic self-adjustment for possible deflection or building settlement. • Ability to turn corners with 2¾" radius, permitting a square corner. • Walls can operate within an inch of columns, etc. without interference. • Units can be stacked side by side with only one head and floor guide across the opening (unique with Unitslide). • Smooth, fast, dependable operation, with tight closure insured. No mechanical power required. • Foolproof design—units cannot be displaced. • Folding Walls can be locked in position with one cylinder lock. • Minimum stacking space. • Odd or even number of units of equal or varying widths may be used in any Fairhurst Folding Wall.



Continuous slate blackboard and recessed chalk rail show functional uses of Unitfold Wall. This installation in Boston University has served since 1939 without maintenance or repair. Cram & Ferguson, Architects.

Fairhurst TRADEMARK

SCHOOL WARDROBES

the Disappearing Door Wardrobe was originated by John T. Fairhurst

PROVED BY TEST TO BE THE STRONGEST WARDROBE HARDWARE MADE.

• The upright from floor to ceiling is behind the upper hook rail and slightly in front of the lower, so that no obstruction is presented in entering or leaving the wardrobe. • The open doors do not project more than 1½″ beyond the face of the wardrobe if standard recess dimensions are conformed to.

◄ **The BEST PROOF of superiority is ACTUAL SERVICE. Read this letter for proof of value. NO MAINTENANCE EXPENSE IN 23 YEARS OF USE!**

Telephone: TAlmadge 9-1304

CHURCH OF ST. BENEDICT
2956 BRUCKNER BOULEVARD
BRONX 61, N. Y. C.

June 9, 1954

John T. Fairhurst Co., Inc.
45 West 45th St.
New York 36, N.Y.

Dear Sirs:-

Your company installed the wardrobes in our school in 1931. They have been in use since that time and are as good today as the day you installed them.

Our parish has expanded so that it will be necessary to open additional classrooms this Fall. Considering the fact that Fairhurst Wardrobes were installed when the school first opened in 1931 and have given such fine service, we intend to have your company install these extra wardrobes this Summer.

Very sincerely yours,

Rev. Albert Heuring, O.S.B.
Pastor



23 Years of Constant Service

Fairhurst Wardrobe installed in 1931 at St. Benedict's School, Bronx, N.Y. There are 24 Fairhurst Wardrobes in this school. Gustave Steinback, Architect.



Typical schools with Fairhurst Wardrobe installations: P.S. #38, Jersey City, N.J.; St. Ann's School, Flushing, N.Y.; Bowers School, Manchester, Conn.; Holy Ghost School, New Hyde Park, N.Y.; Temple Beth-El, Providence, R.I.; Johnston H. Cooper Elem. School, Vallejo, Calif.; Elem. School #5, L.I., N.Y.; Barnum Woods School, L.I., N.Y.; Assumption Parochial School, Chicopee, Mass.; Englewood Cliffs School, Englewood Cliffs, N.J.; Meade St. School, Watertown, N.Y.; Rockville Center School, L.I., N.Y.; River St. High School, Red Bank, N.J.; Weager School, Stamford, Conn.; Washington St. School, Hagerstown, Md.; Delhi Township School, Cincinnati; Cleveland School, Cranford, N.J.; Western Ill. State Teacher's College, Macomb, Ill.; P.S. #114, Bronx, N.Y.; Center School, Litchfield, Conn.; St. Anne's School, Warren Point, N.J.; Lloyd H. Bugbee School, W. Hartford, Conn.

THE SANYMETAL PRODUCTS CO., INC.

1702 Urbana Road, Cleveland 12, Ohio

Toilet Compartments, Shower Stalls and Dressing Room Compartments

CENTURY Ceiling-Hung Toilet Compartments
NORMANDIE Floor-Supported Toilet Compartments
ACADEMY Over-Head Braced Toilet Compartments
SHOWER STALLS and Dressing Room Compartments
SHOWERMASTER Shower Cabinets
HOSPITAL CUBICLES

Washroom environments in school buildings are of the utmost importance. The training of children in personal hygiene that begins at home should be continued at school in an environment that reflects cleanliness, orderliness, dignity and encourages respect for sanitary facilities. Toilet compartments usually dominate a washroom environment. Therefore, the proper type and color scheme should be selected with the utmost care and consideration because of the influence they will have upon the children.

Sanymetal Toilet Compartments are designed and built to enhance the washroom environment and to give long years of service under the unusual conditions that are common to school washrooms. They embody exclusive proven engineered features, the result of 40 years' experience.

Out of specialized experience covering over a million toilet compartment installations, Sanymetal engineers have developed several different types of toilet compartments and have utilized fully the enduring qualities of high corrosion-resistant steels that have become available in recent years. The construction of Sanymetal toilet compartment partitions, doors and pilaster, which are combined to form a toilet compartment, is as follows:

(1) Two sheets of steel, pan formed, assembled over and cemented under pressure to; (2) a dense, sound-deadening core insulation; (3) formed edges of the two sheets of steel are electrically welded together, and (4) sealed with continuous oval crown locking strip of stainless steel on "Porcena" (vitreous porcelain on steel) only; baked enamel steel locking strip on others, mitered and welded at corners. Electrically welded construction utilizes to full extent the structural strength inherent in each sheet of steel and results in rigidity that is unobtainable otherwise. Sanymetal Partitions, Doors and Pilasters are made under U. S. Patents Nos. 2,240,482; 2,240,484; Patents Pending and Patents Applied For.

You can get steel toilet compartments that are Rust-Proof, Fracture-Resistant— that stay new always



. . . that reduce maintenance costs to an all-time low—that provide economies and advantages *which cannot be duplicated by any other material* suitable for toilet compartments.

Sanymetal "PORCENA"

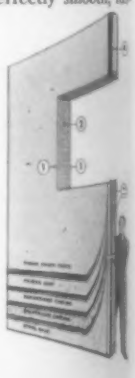
(Vitreous Porcelain on Steel)

Sanymetal "Porcena" (Vitreous Porcelain on Steel) Toilet Compartments provide enduring beauty, fadeless colors, structural durability, resistance to acids, resistance to defacement and abuse. Sanymetal "Porcena" Units are rust-proof and will not fracture through their cross-sections. The flint-hard, glass-smooth surface can be kept as immaculately clean as a china plate, thus reducing maintenance of cleanliness to an all-time low. The glass-hard, lustrous finish of Vitreous Porcelain on Steel does not fade, tarnish, peel or discolor. The original luster and freshness of colors is never lost. Sanymetal "Porcena" (Vitreous Porcelain on Steel) is incomparable with any other material commonly used for toilet compartments. It is a lifetime material that stays new. This everlasting newness is the result of a correct combination of the desirable qualities of the hardness of glass and the natural structural strength of steel.

Sanymetal "Porcena" (Vitreous Porcelain on Steel) is unlike paint enamel or lacquer-finish steel because the vitreous porcelain is fused to steel at temperatures ranging from 1350° to 1550° F. This impregnates the steel with vitreous porcelain enamel and makes it corrosion-proof in the event the surface is ever damaged. Be sure to get rust-proof, fracture-resistant Sanymetal "Porcena" Toilet Compartments.

Sanymetal "TENAC" *(Synthetic Enamel Baked-On Over Galvanized and Bonderized* Steel)*

This is a full-purpose metal base material that is notable for the positive adhesion of synthetic enamel baked-on to the basic metal. It is highly resistant to corrosion. There is a considerable difference in durability or service life between a sheet of basic metal that has been *galvanized and Bonderized** and a sheet of metal that has been given *only a Bonderized* coating. Galvanized and Bonderized** steel lasts three to five times longer than a sheet of steel to which only a Bonderized* coating has been applied. Sanymetal recommends and uses whenever specified *Galvanized and Bonderized* Steel* for "Tenac" compartments. This double coated steel costs on the average 50% more than plain steel without a double coating treatment, *but the installed cost of toilet compartments of this double coated steel is only approximately 10% more.* When a sheet of basic metal has been fully protected by a *galvanized coating and Bonderized* coating*, it is then given a primer coat and finish color coats of synthetic enamel baked-on, which provide more protection for the basic metal and give a perfectly smooth, lustrous, protective finish.



Sanymetal Toilet Compartments are time-tested and proven products that give longer years of service life and reduce maintenance costs to an all-time low.

**Treated with "Bonderite", a product of Parker Rust Proof Company*

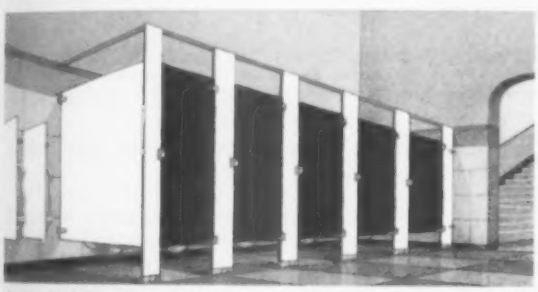
THE SANYMETAL PRODUCTS CO., INC.

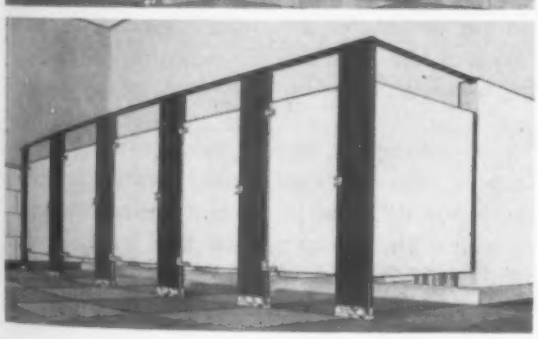
CENTURY TYPE *(Ceiling Hung)*

Hung rigidly from structural overhead carrying members. When combined with wall-type toilets such an installation frees the floor surface of all obstruction throughout the area of the installation and results in reductions of cleaning and maintenance to an all-time low. The CENTURY Type of "Porcena" (Vitreous Porcelain on Steel) is the finest and *most enduring* installation obtainable because doors, partitions and pilasters are rustproof and will not fracture through their cross-sections. Doors and partitions are 1" thick; Pilasters 1¼" thick; constructed as described on opposite page. Sanymetal Door Hardware includes the famous "7700" Concealed, Controlled Gravity-Action Hinge –a hinge that is unlike all other hinges in that it provides for a free swing of the door, and then a way to control the swing of the door. On this hinge the door does not raise or lower as it swings, but stays on the same plane in all positions. Sanymetal Toilet Compartment Hardware is correctly designed, substantially constructed and mechanically perfected to provide the utmost in dependability and convenience. CENTURY Type Toilet Compartments are available in a wide range of colors and color combinations in both "Porcena" (Vitreous Porcelain on Steel) and "Tenac" (Synthetic Enamel Baked-On Over Galvanized and Bonderized* Steel).

NORMANDIE TYPE *(Floor Supported)*

This type toilet compartment is similar in every respect to the CENTURY Type Ceiling Hung except that it is designed to be erected on the floor as illustrated. NORMANDIE Type Toilet Compartments are suitable for installation on various types of floors. Before planning installation on any type of floor construction, consult a Sanymetal Representative to be sure of a floor construction that will make a permanently rigid installation. Doors and Partitions are 1" thick; Pilasters 1¼" thick; constructed as described on opposite page. Sanymetal Door Hardware includes the famous "7700" Concealed, Controlled Gravity-Action Hinge, and other hardware as described in foregoing description for CENTURY Type. Base of Pilaster and floor anchorage is concealed by 3" high stainless steel plinth which serves as a mop molding. NORMANDIE Type Toilet Compartments are available in a wide range of colors and color combinations in both "Porcena" (Vitreous Porcelain on Steel) and "Tenac" (Synthetic Enamel Baked-On Over Galvanized and Bonderized* Steel).









ACADEMY FLUSH TYPE *(Overhead Braced)*

There is a certain distinctiveness about an installation of ACADEMY Flush Type Toilet Compartments with pilasters extending well above the doors and partitions and united with an overhead brace of modern design. The tubular head rail assembly extends horizontally through the top of pilaster and is securely fastened in position, thus making a strong, sound, rigid construction throughout. Permanently rigid installations can be obtained on floors or where sub-floor construction ordinarily would not provide a suitable base for rigidity. Doors and Partitions are 1" thick; Pilasters 1¼" thick; constructed as described on opposite page. Sanymetal Door Hardware includes the famous "7700" Concealed, Controlled Gravity-Action Hinge and other hardware as described in foregoing description for CENTURY Type. ACADEMY Type Toilet Compartments are available in a wide range of colors and color combinations in both "Porcena" (Vitreous Porcelain on Steel) and "Tenac" (Synthetic Enamel Baked-On Over Galvanized and Bonderized* Steel).

ACADEMY FLUSH TYPE

Shower and Dressing Room Compartments

Shower stall installations may be with or without dressing rooms. Shower stall installations are usually composed of partitions and pilasters (no doors) in any size that complies with the modular system of dimensional coordination. Shower stall and dressing room compartments are usually composed of shower compartments and dressing rooms with doors for each of the dressing room compartments. The opening between the shower stall and dressing room compartment is usually equipped with a white duck curtain. Doors and Partitions are 1" thick; Pilasters 1¼" thick; constructed as described on opposite page. Sanymetal Door Hardware includes the famous "7700" Concealed, Controlled Gravity-Action Hinge, and other hardware as described in foregoing description for CENTURY Type. Shower Stalls and Dressing Rooms are available in a wide range of colors and color combinations in both "Porcena" (Vitreous Porcelain on Steel) and "Tenac" (Synthetic Enamel Baked-On Over Galvanized and Bonderized* Steel).

See SWEET'S Architectural File $\frac{21b}{Sa}$ or write for 20-page Sanymetal Catalog and Brochure on No. "7700" Hinge.

THE *Sanymetal* PRODUCTS CO., INC.

1702 URBANA ROAD, CLEVELAND 12, OHIO

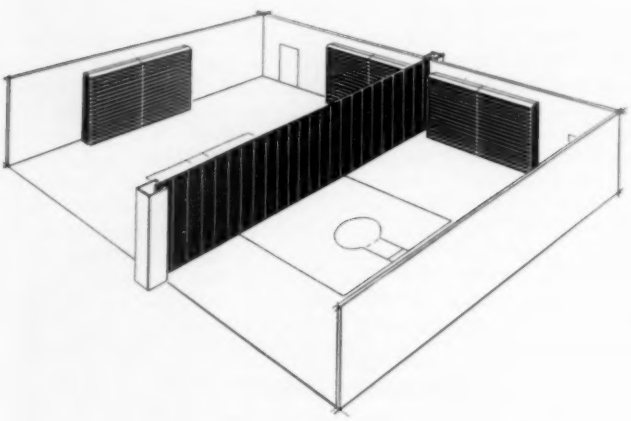
WAYNE IRON WORKS

Wayne Penna.

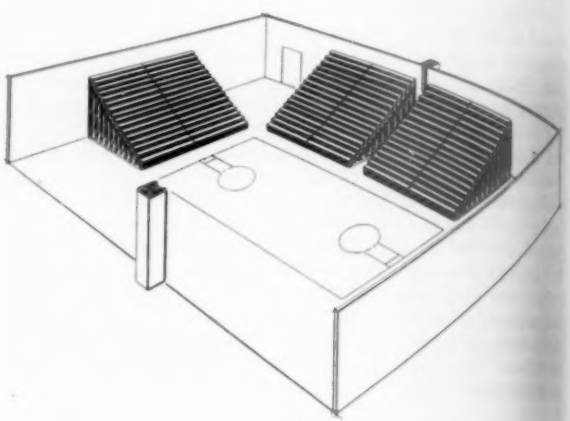
WAYNE AUTOMATIC ELECTRIC FOLDING PARTITIONS for GYMNASIUM · CLASSROOM · AUDITORIUM

In the planning of new schools, Wayne Automatic Electric Folding Partitions are the key to economical design. By converting gymnasium, auditorium, and exhibition areas into separate spaces, these facilities are made available for many different purposes.

Wayne folding partitions are custom engineered to specific requirements so as to divide a single area with a sound-proof partition effectively and automatically. Two or more intra-school, classroom, or other activities may be carried on simultaneously in what was previously a single area.



Wayne Automatic Electric Folding Partition extended, with 16-row Wayne Gymstands in closed position.



Wayne Automatic Electric Folding Partition folded, with 16-row Wayne Gymstands in open position.

Design and Construction

Wayne Automatic Electric Folding Partitions are designed to individual requirements. The installation provides hinged panels in series which, when fully extended, present a flush surface approximating a solid wall. This will readily accept any decoration in keeping with the gymnasium or auditorium. The unit is built to withstand normal abuse, shock, and wear.

The folding and unfolding operations are fully automatic and powered by an electric motor operating a sprocket and chain drive. Control is provided by an electrical key switch located in a convenient position for the operator. The key may be removed to prevent operation by unauthorized persons.

Wayne partitions travel on a 4″ I-beam track. The trolleys employ side guide rails and rollers to insure friction-free straight line motion. *No floor track is required.* This leaves the floor area free from obstacles when the partition is in a folded position.

During the opening and closing operations of the partition panels, a 1″ clearance is maintained between the base of the panels and the floor. In the final closing movement, a sealing strip in the bottom of each panel is caused to drop sufficiently to seal automatically the space between the floor and panels. This locks the entire structure in position.

WAYNE AUTOMATIC ELECTRIC FOLDING PARTITIONS



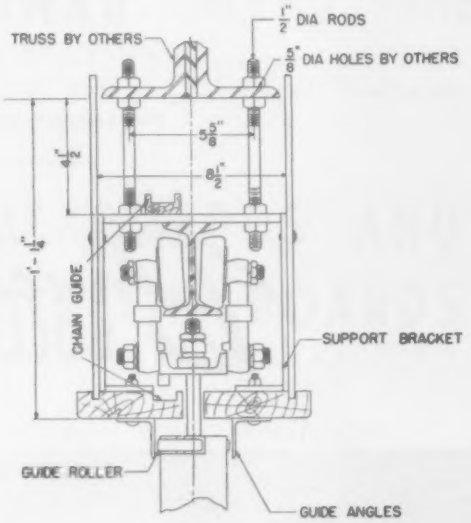
Wayne Automatic Electric Folding Partitions shown installed in a typical school gymnasium.



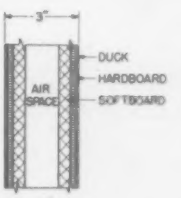
Wayne Automatic Electric Folding Partitions shown installed in a typical classroom.

Partition Panel Construction

Wayne folding partitions are available in three basic types of panel construction. Other types of panel construction are available where standard types do not meet special requirements. Consult your Wayne representative or write direct for information concerning your specific problem.

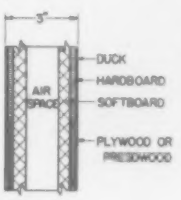


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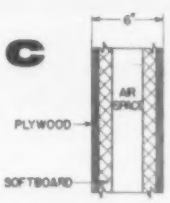
Two layers of softboard insulation
Two layers of hardboard
Covered with No. 10 duck

b

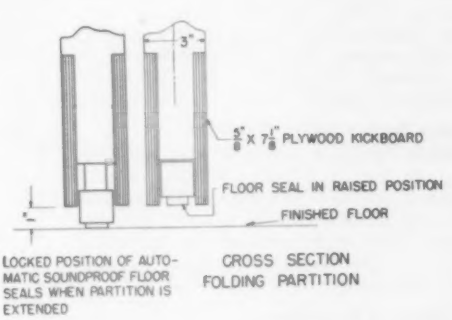


Two layers of softboard insulation
Two layers of hardboard
Covered with No. 10 duck
Plywood or hardboard wainscot

c



Two layers of softboard insulation
Both faces covered full height with plywood hardwood



LOCKED POSITION OF AUTOMATIC SOUNDPROOF FLOOR SEALS WHEN PARTITION IS EXTENDED

CROSS SECTION FOLDING PARTITION

"Wayne Stands for Safety"

WAYNE IRON WORKS, 544 N. Pembroke Avenue, Wayne, Penna.

BANGOR CORK CO.

Pen Argyl, Pennsylvania

This Company has specialized in Cork Bulletin Board since 1936.

Bancork BULLETIN BOARD MATERIAL



***Bancork Bulletin Board Material* is ideally suited for school, office, church and hospital bulletin boards. It is the finest background for posting announcements, class work, pictures, etc.**

Best Cork Obtainable

Bancork is made of the best cork available, in roll and sheet form especially for bulletin board use. It is absolutely uniform in density and thickness. Its specially compounded binder insures pliability and softness during the entire life of the material. Satisfaction is GUARANTEED.

Retains Tack-Holding Qualities

Bancork Bulletin Board Material retains its tack-holding qualities despite repeated use. It holds the tacks because the cork surface is soft, spongy and resilient. Only slight pressure is necessary to insert the tacks, and they can be taken out easily.

Available in Six Colors

In keeping with modern design, Bancork is now available in six colors: Desert Tan, Toast Tan, Willow Green, Spray Green, Field Green and Beach Gray. This selection of color now makes it possible to plan even more pleasant combinations of color as they harmonize with the various chalkboards and blend with room decorations.

Easy to Maintain

Bancork Bulletin Boards withstand constant use without painting or other surface refinishing. Desert Tan and Willow Green are the new improved type of bulletin board material. They have a linen finish and a new improved surface coating designed to make maintenance easier. This coating protects the board from hand marks during installation as well as from dirt and grime during use. The only maintenance that is needed is an occasional washing with lukewarm water and Armstrong's Liquid Cleaner. Toast Tan, Field Green, Spray Green and Beach Gray have a sanded finish and a burlap back and can be cleaned by sanding lightly.

Light Reflectance Values

Bancork Bulletin Board Materials have a light reflectance of from 19% to 28%, according to type chosen. They help reduce eyestrain and nervous fatigue.

Mounted Bulletin Boards

¼" gauge Bancork is mounted on ¼" Masonite Quarterboard for a ⅜" thickness, or ¼" Homasote for a ½" thickness. All ¼" gauge Bancork is mounted on standard Masonite Presdwood, either ⅜" or ¼" thick.

Easy to Install

Unmounted cork bulletin board, ¼" thick, can be laminated to any smooth plastered wall or wall board. Mounted bulletin board, ⅜" or ½" thick, can be applied to any type wall by following our installation instructions which we will be pleased to furnish upon request.

BANRITE CHALKBOARDS

Banrite Chalkboards are made for functional durability, and are designed to harmonize with modern and traditional architectural requirements of classrooms. The non-glare, smooth finish of Banrite Schoolastic Green provides a shade of green that is the result of research into the factors of light reflectance, eyestrain, contrast with chalk, and readability. Banrite Chalkboard is a board of high quality and great strength, at low cost. It consists of primer and finishing coats of tough Vinyl Plastic bonded to a hardboard. The abrasive materials used in the finish are intimately bound together with Vinyl Plastic. This combination provides the necessary "bite" for excellent chalk acceptance, together with the highest degree of abrasion resistance. It takes a full, clear chalk mark, and is easily erased. The surface is unaffected by water, and readily cleans to its original shade of non-fading green.

The hardboard is light in weight, and is designed to prevent warping and breaking. Available in one piece in any size up to 4' x 12'. Lengths longer than 12' may be furnished in two or three equal pieces, and can be set with matched joints or metal strips of the same color.

These materials are available through various dealers throughout the United States and Canada. If there is no dealer in your locality, or, you desire our BROCHURE, contact the Bangor Cork Co., Pen Argyl, Pa.

CLARIDGE PRODUCTS and EQUIPMENT, Inc.

6731-6733 No. Olmsted Avenue, Chicago 31, Illinois

Manufacturers of Chalkboards . . . Corkboards . . . Trim . . . School Equipment

Claridge

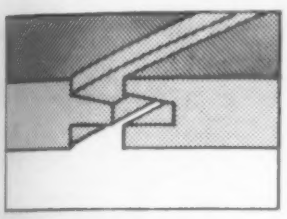
CHALKBOARDS AND BULLETIN BOARDS

COMPANY "FIRSTS"

Constantly striving toward a better product, CLARIDGE has *pioneered* many improvements. To name a few, we were

FIRST . . . to manufacture a ½" chalkboard
. . . to manufacture chalkboards with a full .007" writing surface.
. . . to achieve even suspension of silicon carbide through the full writing surface depth.
. . . to manufacture chalkboards with a tongue-and-groove joint.

IMPROVED materials, IMPROVED production methods, even IMPROVED packing, shipping and distribution enables us to offer chalkboard and corkboard of exceptional quality at surprisingly low cost.



#100 Duracite with new improved inter-locking self-aligning tongue-and-groove joint.



Duracite has dent-proof, long-wearing surface, tested for more than 40 years average classroom use.

PRODUCT ACCEPTANCE

Our equipment has won the respect of thousands of architects and builders who have installed it.

It has proved its ability to please instructors, students, administrative boards in schools and institutions the nation over.

Honored with countless MERIT AWARDS.

We have sales representatives in all principal cities . . . designers and engineers, especially trained to work directly with architects.

Special Colors Now Available

CLARIDGE is now able to produce chalkboards in any special color to fit your decor. Colors will be matched from your sample. Contact the factory or your local representative for complete details.

VERS-A-TILT . . . The New *Slant* in Chalkboards and Corkboard





Two usable surfaces . . . chalkboard one side, corkboard reverse side . . . tilted to eliminate reflection and glare. Easy installation cuts cost as much as 90%. Ingeniously concealed storage space behind each panel.

PRODUCTS

CHALKBOARDS

Duracite — **Structoplate**
Vitracite — **Grapholite**
Asbestocite — **Vers-A-Tilt**

BULLETIN BOARDS

Claridge — **Fabricork**
Nucork

Samples and Catalogs Furnished Upon Request.

INLAND STEEL PRODUCTS COMPANY

4031 W. Burnham Street, Milwaukee 1, Wisconsin

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MILCOR

REG. U. S. PAT. OFF.

Metal Trim

meets school requirements for safety ☆ service ☆ sanitation

Permanence, fire safety, and resistance to abuse are inherent advantages of Milcor Metal Trim. The complete line includes two basic types: *flush*, or plastered-in; and *applied*, or removable.
By combining various designs of window trim, stools, mouldings, and bases, you can obtain almost any interior architectural effect.

MILCOR SOUND-DEADENING INSULMAT

Greatly reduces sound reverberation. Fire-resistant composition applied to all styles of Milcor Metal Trim at slight additional cost. Regularly furnished on Milcor Chalk Trough *at no extra cost.*



Milcor Chalk Trough and Blackboard Trim

A wide selection of moulds and fittings in sizes and types to meet every blackboard design need. All chalk trough furnished with sound-deadening Insulmat backing.





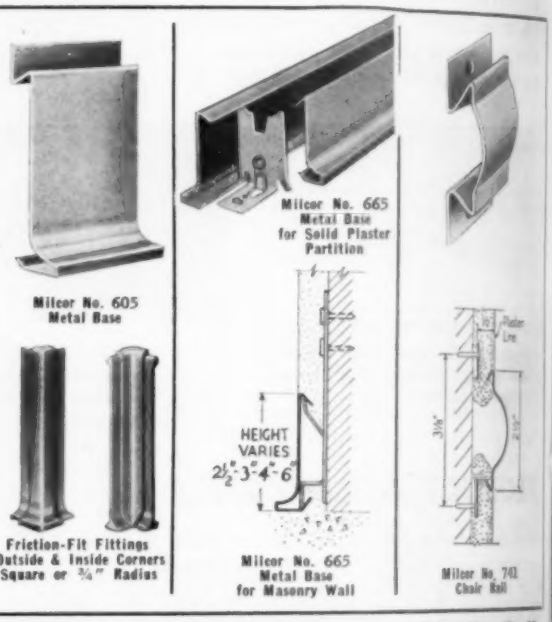
Milcor Metal Window Trim

Furnished in either standard or expanded plaster flange. Available as completely mitred, welded frame, ready to install, or individual units—flush or projecting—which can be used separately or in combination to form any part of window opening. Complete or ¾ frames in any size to meet specifications up to 8′ x 12′. Square, projecting, or radius stools.



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Three types, with or without expanded metal wing. Fit flush to wall—provide access to utility and wiring systems. New spring hinge permits door to open 175° for easy work entry. Sizes from 8″ x 8″ x 24″ x 36″. Flush, cam-type lock. Number of hinges and locks determined by size of door.



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Many practical designs, sizes, and weights. With prime-coat, to accept any subsequent painting or decorative treatment. Corner fittings and terminals to match. Chair rail, mouldings, and other accessories available.

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THE JECMEN COMPANY

4608 West 20th Street, Chicago 50, Ill.

JECMEN

QUALITY CHALKBOARDS—BULLETIN BOARDS

COMPARE THESE *FIRSTS* AND YOU'LL CHOOSE JECMEN

SKYRITE

first porcelain enamel steel chalkboard embodying structural sandwich construction with Aircomb by Douglas Aircraft Company.

IMPERIAL

first full ½" thick tempered hardboard chalkboard with V-200 writing surface for durability. Precision tongue and groove joint for easy installation.

AUTOGRAPH

FIRST ¼" thick chalkboard with a tongue and groove joint. Featuring the famous V-200 writing surface applied to tempered hardboard backing.

CENTURY

FIRST cement asbestos chalkboard incorporating both positive moisture barrier to prevent blooming, and the V-200 writing surface.

E-KON-O-BOARD

FIRST low cost chalkboard on hardboard backing with the V-200 writing surface.

JECMEN TOP GRADE BULLETIN BOARDS

Made of the world's finest cork materials uniformly pulverized and permanently bonded under tons of hydraulic pressure. Reinforced with burlap backing. Available in rolls, sheets or mounted.

E-KON-O-KORK

For the installation where both quality and cost are to be considered, E-Kon-O-Kork is the answer. Available unmounted or mounted.

VERS-A-TILT

FIRST prefabricated reversible chalkboard-bulletin board unit. Comfortably slanted to reduce eye strain. Conveniently adjustable for the fluctuating demands in today's school rooms.

THE JECMEN COMPANY, YOUR CHALKBOARD SPECIALIST!

To produce an item of exceptional quality, the manufacturer must distinctly LIMIT THE NUMBER OF PRODUCTS he endeavors to produce.

This is precisely what The Jecmen Company has done. We firmly believe that chalkboard and bulletin board are specialized equipment. We believe you will recognize wisdom in our thinking. Many manufacturers, similar in size to The Jecmen Company, attempt to manufacture many times the number of products. This means, simply, that each of the items produced receives less attention than is vitally needed.

The executive and engineering officers of our company are not new in the manufacture of chalkboards and bulletin boards. The ownership of The Jecmen Company is the same as that of one of Illinois' pioneer industrial firms, tracing its origin back to 1864. Our officers have been allied with the school construction program in the sale, distribution and manufacture of chalkboard and bulletin board for years.

Jecmen's modernized production equipment operates with the accuracy of precision laboratory instruments . . . to GUARANTEE standard colors, standard thicknesses and sizes, uniform writing surface excellence.

Write today for your catalog and samples of the complete Jecmen Line of quality chalkboards and bulletin boards.

JECMEN

THE JECMEN COMPANY

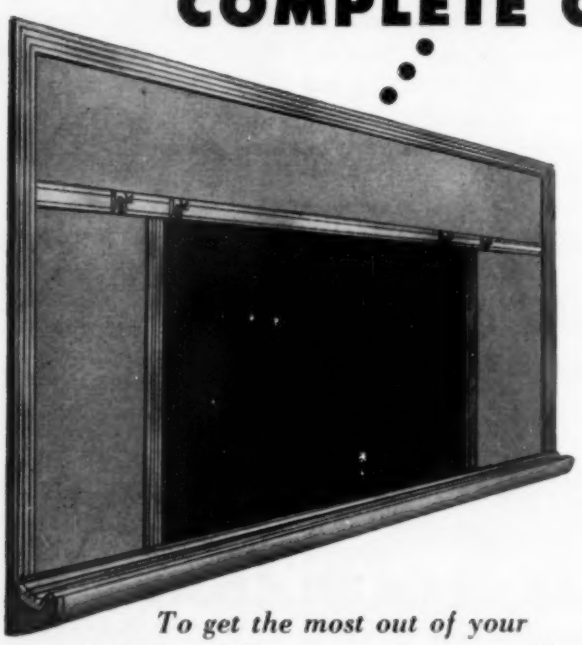
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1217 W. Washington Blvd., Chicago 7, Illinois

The RIGHT ANSWER.....



LOXIT COMPLETE CHALKBOARD SYSTEM



To get the most out of your building dollar, consult your architect and follow his advice

Architects and school authorities know that the physical properties of a classroom have a direct bearing on the attentiveness and efficiency of pupils. The chalkboard set up is an important factor for better attentiveness and greater efficiency. The Loxit Complete Chalkboard System provides the right answer.

LOXIT TRU-SNAP Trim — LOXIT-TYLAC RITE GREEN Chalkboards — LOXIT-TYLAKORK Tackboards LOXIT PORCELOX Porcelain Steel Chalkboards

Installation is simple, the appearance is beautiful — and stays that way. Years of trouble-free service are assured. The all-aluminum TRU-SNAP trim with its smooth, non-glare GLO-DULL* finish is fireproof; doesn't warp, expand or contract; cleans easily and never needs repairing. All LOXIT chalkboards provide excellent writing surfaces with low reflectivity—the ultimate in eye-ease -- and can be washed as often as necessary.

*Reg. U. S. Pat. Office

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LOXIT SYSTEMS INC

PENNSYLVANIA SLATE PRODUCERS GUILD, INC.

205 Realty Building, Pen Argyl, Pennsylvania

A trade association dedicated to serve those interested in the advantages of using natural slate products

Natural Slate



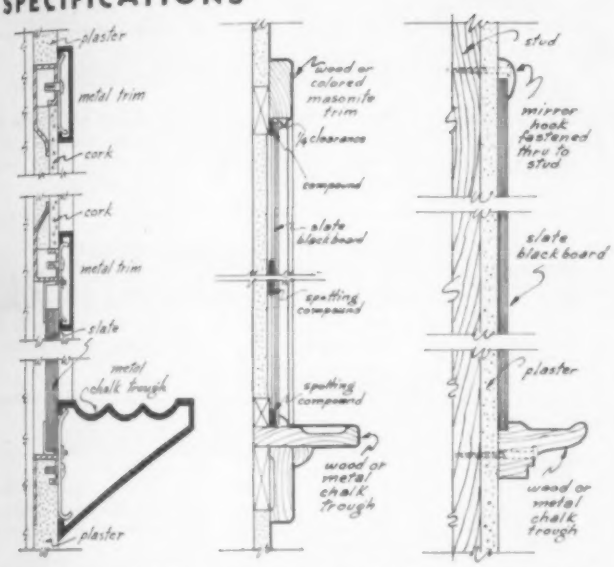


Ralph R. Smith School, Hyde Park, N. Y.
Perkins & Will, architects—engineers, Chicago, Ill.

still THE WISEST CHOICE IN CHALKBOARDS

There are reasons which prompted the choice of slate in such exemplary school installations as the recently erected Ralph R. Smith Elementary School in Hyde Park, N.Y., pictured above. Natural slate is easiest to see . . . to clean . . . to budget . . . to adapt to color schemes. It is the best attention catcher, has the longest life and best writing qualities.

SPECIFICATIONS



1. All chalkboards as shown on plans shall be of natural slate, quarried and fabricated in U.S.A.
2. Thickness, width, and lengths as customary for slate chalkboards.
3. The slate shall be of finest quality selected blackboard stock, even in color, and free from ribbons or imperfections, that would impair its use or durability as a writing surface.
4. The slate chalkboards shall be installed in accordance with the architect's detail and approved manufacturer's installation drawing.

Other Uses of Slate in the School

Roofing	Shower Compartments
Baseboards	Laboratory Table Tops
Sinks	Toilet Stalls
Window Sills	Window Stools
Flooring	Shelves

Write for information

on chalkboard selection, use and care. Personal assistance, if you wish, with chalkboard selection . . . no obligation.



"500 million years in the making"... NATURAL SLATE

E. W. A. ROWLES CO.

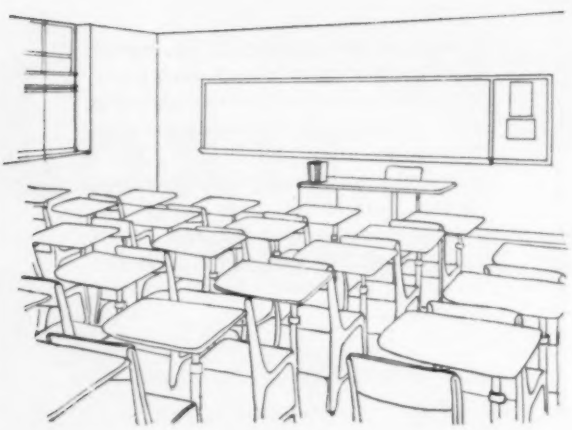
Manufacturers of School Equipment, Classroom Seating and School Furniture

Arlington Heights, Illinois

For better

classroom living . . .

ROWLES SCHOOL EQUIPMENT





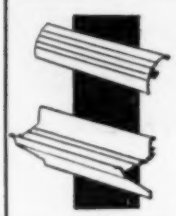
See-GREEN CHALKBOARDS

A new soft, pleasing light green color that makes classrooms brighter, lighter and more cheerful. Rowles offers four famous chalkboards—ENDURAROC, Super PERMASITE, PERMASITE and DUROPLATE—one to fill every specification. All four available in See-GREEN or black.



See-GREEN BULLETIN BOARDS

A fresh inviting new light green color for cork boards harmonizes perfectly with See-GREEN Chalkboards. Available in Perma Kork, ¼" unmounted or ½" mounted. Also DURATEX, ⅛" cork bonded to ⅜" fiberboard. Also regular tan.



ALUMINUM CHALKBOARD TRIM

Bright satin-finished aluminum moldings for trimming chalkboards and bulletin boards. A complete line for every type of installation. Modern, durable and easy to install. Matching chalk trough.



MASTERMADE WINDOW SHADES

Rowles has a complete line of high quality cotton duck shades for efficient control of classroom lighting. Shades are available to fit any type of window opening, regardless of size or shape of opening.



LITE-TITE DARKENING SHADES

Rowles is your headquarters for all your darkening equipment. Double-coated leatherette shades for total blackout, or black cotton duck shades for darkening classrooms for audio-visual purposes.



LITE-TITE DARKENING CHANNELS

Increases the efficiency of your darkening shades. Aluminum or metal channels completely eliminate all light and give 100% blackout. Very attractive, durable and easily installed.

See your local ROWLES SCHOOL EQUIPMENT DEALER

ROWLES
School Equipment

For authoritative help in planning your classrooms, ask your local Rowles School Equipment dealer for copies of these big Rowles School Equipment catalogs, or write direct to

E. W. A. ROWLES COMPANY
ARLINGTON HEIGHTS, ILLINOIS



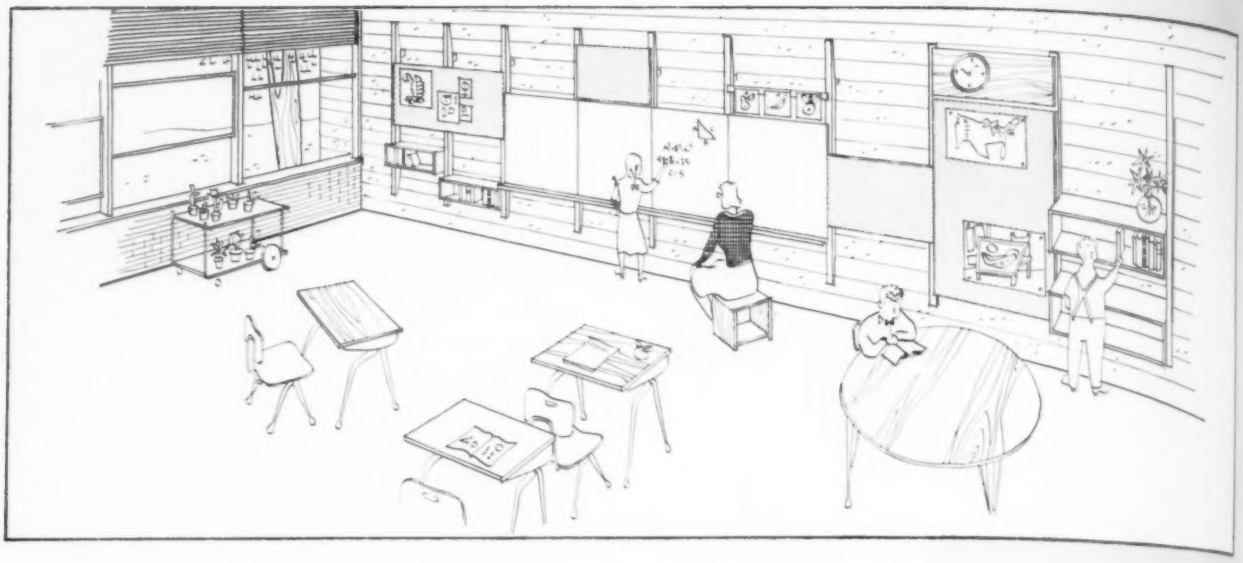


MODUWALL INSTALLATION, MEADOW DRIVE SCHOOL, MINEOLA, LONG ISLAND

CLASSROOM WALLS COME ALIVE WITH

Moduwall

PATENT PENDING



for today's educational program

"When the pupils are in their classroom, they will be engaged in a wide variety of activities—planning, discussing, sharing, using audio, visual and audio-visual aids, reading, arranging exhibits, writing letters and reports, constructing a puppet play, singing, computing the costs of a project, tracing a trip on a map, finding information for solving a problem, working out a creative drama, playing an indoor game.

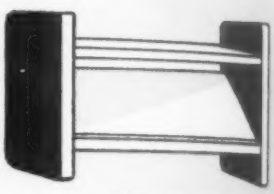
"For some of these activities, all of the children of the room may be together (singing, playing games); for some, small groups of two to eight may work together (constructing, reading); for others, some children may work individually (finding information, writing a letter). Flexibility of equipment and plenty of space will be needed for these types of experiences. Movable bookshelves, art centers and tables will be desirable.

"Middle grade children of this school need plenty of space and flexible furniture and arrangements so that they may carry out the varied activities of their learning experiences. Both pupils and teachers need ample storage space and places for displaying visual aids and pupils' work."

—"Designing Elementary Classrooms"
Special Publication No. 1
U. S. Office of Education

Live-wall
TRADE MARK

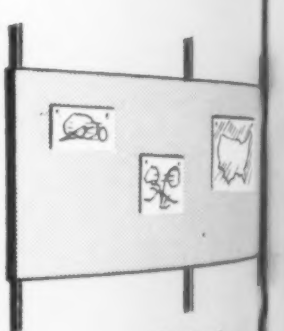
EQUIPMENT UNITS



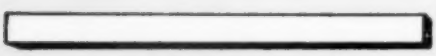
Magazine Rack



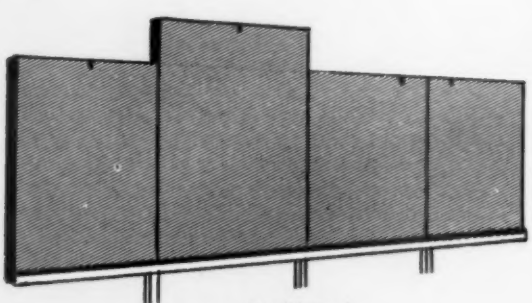
Bookshelf



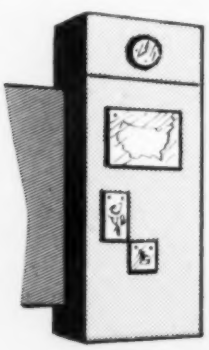
Tackboard



Utility Rail



Chalkboard



Teacher's Closet
& Clock Panel

moduwall *Live-wall* combines flexibility and economy

Moduwall Live-walls solve a problem that has perplexed school administrators and teachers for years. Up to now the arrangement of everyday classroom equipment such as chalkboard, tackboard and shelving has been considered permanent and immobile. Every classroom has been alike regardless of the differing needs of the children and teachers from month to month and year to year.

Now Moduwall Live-walls make it possible to move equipment about to meet any classroom situation. The process is as simple as taking a picture off a hanger and putting another in its place.

Live-wall chalkboard, tackboard and other units are held firmly in place by a series of parallel standards equipped with precision metal holders. The Moduwall standards are permanently installed in the classroom wall.

With Moduwall, classroom walls become alive and responsive to changing teaching needs. Classrooms are liberated from fixed-use patterns which until now have been determined by the character of their built-in equipment. Moduwall Live-walls make classrooms better places for teaching. They also are economical—eliminating the waste of fixed equipment that cannot be moved when it is not needed by the current classroom program.

moduwall *Live-wall* brings warmth & color to the classroom

The beautiful texture and colors of Live-wall vinyl plastic tackboard, the warm colors—red, yellow, blue and green—in which Live-wall shelving is available, the natural finish of the Live-wall hardwood or the beauty of Live-wall aluminum standards enliven and decorate the classroom. Each classroom becomes individual with a warm and friendly feeling, more fully 'home' to the children.

moduwall *Live-wall* features

1. **Interchangeability of Classroom Equipment**
   Moduwall Live-walls are so designed that materials such as chalkboard, closets and shelving that are usually permanently fastened to walls can be readily removed and rearranged within the room.
2. **Convertibility of Classroom Use**
   Live-wall equipment units of any type can be replaced by those suited to a different room use.
3. **Adaptability to Different Age Groups**
   The height of Live-wall chalkboard, cabinets, shelving, etc., can be adjusted to the size of the children who will use them.
4. **Warmth and Color in Wall Decoration**
   Live-wall chalkboard is available in green or black. The color range of other Live-wall equipment is wide enough to make possible any desired decorative effect.
5. **Economy of Equipment**
   The interchangeability of Live-wall units saves schools needless expense. No piece of Live-wall equipment has to stay a single day in a room where it is not being used. It can be quickly relocated where it is more urgently needed.
6. **Economy of Maintenance**
   Suspension of all Live-wall units clear of the floor means greater speed and ease of cleaning floors. Wall surfaces back of units are readily accessible.
7. **Economy of Construction in New Buildings**
   Moduwall Live-walls s'retch the school plant dollar. They cost little to install. Live-walls eliminate expense of plastering walls, trim for chalkboard and tackboard.
8. **Economical Modernizing of Older Schools**
   Moduwall Live-walls modernize classrooms in older schools at minimum expense, contributing complete flexibility of equipment and use and also warmth of color and beauty in the classroom.
9. **Versatility**
   Moduwall Live-walls are as versatile as the needs and ideas of architects and educators. A glance at the specifications on page 4 of this folder will indicate just a few of the equipment items adapted to Live-wall use. We shall be glad to quote on supplying other units that may be desired for a Moduwall installation.

specifications

Live-wall Standards—Supply LIVE-WALL standards as made and furnished by MODUWALL, Inc., of New York, N. Y., where indicated on plans or details for classrooms and other areas.

(a) LIVE-WALL assemblies consist of vertical standards and associated hardware, fitted with basic metal supports which will permit perfect alignment, both horizontally and vertically, to any wall surface.

(b) Hardware required for securing normally floor or wall-supported teaching aids (as available from MODUWALL and described below) is regularly supplied with each standard. These specialized items of hardware are engaged by a keyhole standard housed into the vertical wood standard, permitting vertical adjustments of the teaching aids in 1-5/8-inch increments.

(c) The wood standards are built up on hardwood cores and are available in teak, maple and other hardwood finishes. All finish hardware furnished with LIVE-WALL standards is available in either nickel or brush chrome finish.

(d) LIVE-WALL standards are also available in satin finish extruded aluminum.

Live-wall Chalkboard—LIVE-WALL chalkboard shall consist of composition or porcelainized metal chalkboard in panel widths to fit accurately between the vertical standards, backed by a wood frame glued and screwed to the chalkboard and equipped with means for attaching the chalkboard to the vertical standards. Each chalkboard unit shall be equipped with chalk tray and removable metal chalk screen.

Live-wall Tackboard—shall be of pine plywood, covered with vinyl plastic tightly stretched over tackboard and lapped not less than two inches on all sides onto the back of the tackboard and fastened with staples. Tackboard shall be backed with wood frame and attachment means as specified for chalkboard.

Live-wall Acoustical Panels—shall be of perforated acoustical tile, backed with wood frame and attachment means as specified for chalkboard.

Live-wall Storage and Book Shelf Units—shall be made of ¾-inch hardwood plywood. All exposed edges shall be faced with solid hardwood stripping. Shelf units shall be finished in color and/or natural finish at purchaser's option, and shall be equipped with metal pegs for attaching units to standard.

Live-wall Magazine Racks—shall be of similar materials and construction to storage and book shelf units. Top shelf and sloped display shelf shall be housed into end panels of unit. Racks shall be finished in color and/or natural finish at purchaser's option, and shall be equipped with metal pegs for attaching unit to standard.

Live-wall Utility Rail—shall be made of solid pine in natural finish. Rail shall be equipped with attachment means for suspension on vertical standards. (Utility rails function as map holders and exhibit display rails. A continuous groove is provided in the top edge to hold display cards.)

Live-Wall Teacher's Closet—shall be made of plywood, and shall be equipped with necessary shelving, clothes hooks, and means for attachment to vertical standards. Door facing shall be similar to standard tackboard in material and covering.

Among many other items which may be attached to LIVE-WALL standards are exhibit cases and open shelving, peg boards, art frames, bulletin boards, motion picture screens, map cases, mirrors, supply cabinets and other storage units, coat racks, drop leaf tables, and decorative and utility panels of every variety.

MODUWALL* SERVICE

MODUWALL SERVICE is available to school architects and educational administrators in planning classroom wall utilization and classroom teaching aids. This service includes both the design and manufacture of LIVE-WALL equipment units to meet special requirements.

*SERVICE MARK

Inquiries regarding MODUWALL Live-walls may be addressed to:

MODUWALL, Inc.

175 Fifth Avenue, New York 10, N. Y.

ESTABLISHED Since 1828
Members of the One Hundred Year Association, Inc., of New York

CORNELL IRON WORKS, INC.

36th Avenue at 12th Street, Long Island City 6, N. Y.

102 REPRESENTATIVES IN PRINCIPAL CITIES

OUR 126th YEAR

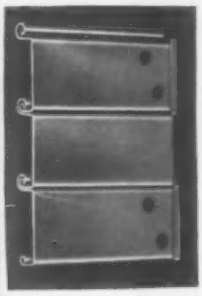
Telephone STillwell 4-3880-1-2-3

PRODUCTS

ROLLING GRILLES AND GATES in steel and other metals; SLIDING GRILLES in steel; ROLLING DOORS and SHUTTERS in steel, other metals and wood; Underwriters labeled rolling STEEL FIRE DOORS: complete line of UPWARD ACTING DOORS in wood or metal MOTOR OPERATORS.



CORNELL ROLLING SHUTTERS, recommended for kitchens; lunch counters; cabinets; school bank, store, checkroom, etc.



CORNELL 1¼" FLAT SLAT for flush surface doors, shutters, of average width



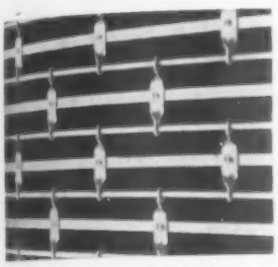
CORNELL Automatic Labeled FIRE DOOR protecting opening in fire wall

METALS USED

In addition to Galvanized Steel, Rolling Doors (except for fire protection) and Rolling Grilles can be made in Aluminum, Bronze or Stainless Steel when such metals are not restricted. A buffed or ground finish is recommended, taking an extra charge over mill finish.

Cornell Iron Works, makers of fine doors for over a century and a quarter, is proud of its uninterrupted family ownership since 1828.

CORNELL ROLLING DOORS AND ROLLING GRILLES



Close-up view of ROLLING GRILLE curtain, CORNELL Standard Butterfly Type

The Rolling Doors are made up of interlocking metal slats running in vertical metal side guides, flexible to coil. Steel curtains are hot galvanized. Rolling shutters for counters, etc. are made of a special design 1¼" flat slat giving a flush surface on the outside. Wood slats strung on metal cables form the curtain of wood rolling doors.

Rolling Fire Doors are labeled by Underwriters' Laboratories, Inc., for fire walls, etc., and carry a 3 hour test label.

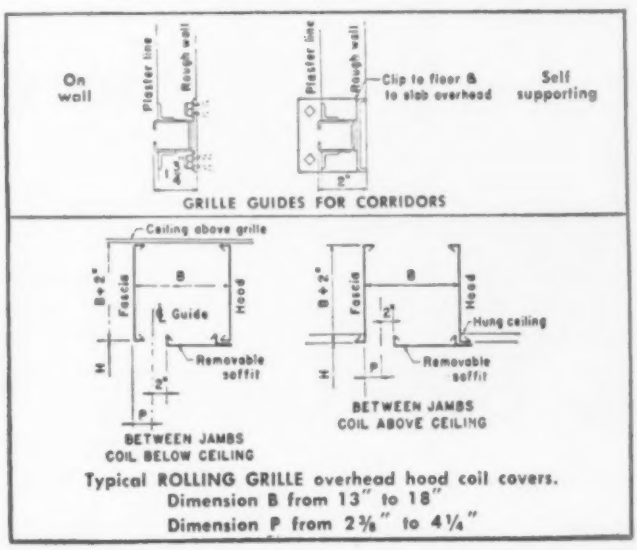
Cornell Iron Works, Inc., are the originators of the Rolling Grille in America. Cornell Rolling Grilles operate like rolling doors, but they do not block light, air, or vision. They have been widely accepted for school corridors, etc. Can be completely concealed when open. Standard Rolling Grilles are made of 5/16" round hard drawn galvanized steel bars running continuous horizontally from jamb to jamb and locked into rolled steel vertical side guides. No opening in the grille shall be large enough to pass a 1¼" diameter ball through. The horizontal bars are flexibly connected by unbreakable vertical steel links; permitting entire grille to coil overhead.

Patented cylinder Locking Device for Rolling Grilles is workable from either side.

SEND FOR CATALOG



An example of one of the many CORNELL ROLLING STEEL GRILLES closing off stairways, New York City Public School



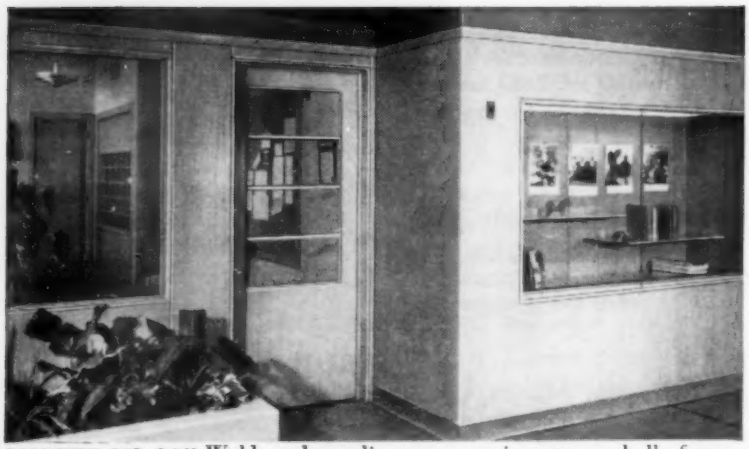
Typical ROLLING GRILLE overhead hood coil covers.
Dimension B from 13" to 18"
Dimension P from 2⅜" to 4¼"



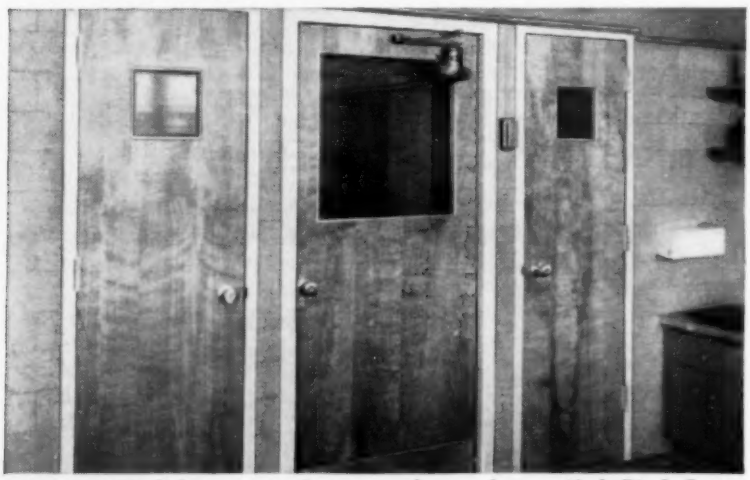
CORNELL ROLLING GRILLE in school corridor. Side guides and overhead coil are concealed in jambs and ceiling

UNITED STATES PLYWOOD CORPORATION

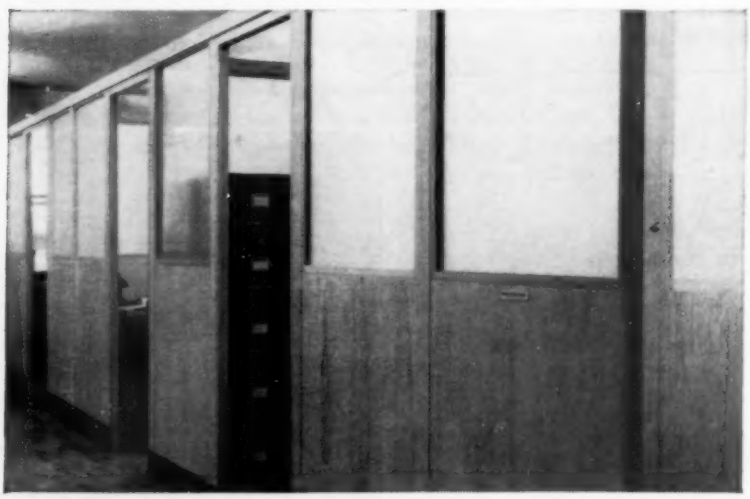
Dept. ASU-54, 55 West 44th St., New York 36, N. Y.



BEAUTIFUL RED OAK Weldwood paneling graces main entrance hall of new Midland School in Rye, N. Y.



DIFFERENT SIZE light cutouts, factory made, can be specified. Birch Stay-Strate Doors in Lake Hiawatha School, Troy Hills, N. J.



PARTITION PANELS can be faced with birch, oak, avodire, elm, gum, mahogany, Korina, walnut, prima vera and many other woods.

HARDWOOD WELDWOOD PANELS

Low first cost Weldwood Plywood is beautifully functional for *every* school location—classrooms, corridors, cafeteria, auditorium, gymnasium.

Low maintenance panels never need painting, never crack or warp.

For inexpensive remodeling. Weldwood panels fit right over existing walls; in new construction, panels are quickly applied over studs. Can be installed *without nails*, using the new Weldwood contact cement.

Weldwood is guaranteed for the *life of the building* in which it is installed.

Fine woods available include oak, birch, walnut, Korina®, Philippine mahogany and many others.

Pre-finished. A wide selection of fine hardwood is now available *factory-finished*, all ready for installation. No on-the-job finishing.

WELDWOOD STAY-STRATE and FIRE* DOORS

WILL NOT WARP—FIRE RESISTANT

Unconditionally guaranteed for the Life of the Installation. Weldwood Stay-Strate Doors are ideal for both interior and exterior use.

Fire resistance of Weldwood Door is due to its incombustible Weldrok® core. Weldrok is an inert mineral material.

Reduces noise. Weldwood Stay-Strate Doors reduce sound transmission about 31 decibels.

Beautiful face veneers offered include oak, birch, walnut, Korina and other fine hardwoods.

Weldwood Fire Door has fire-proofed edge banding as well as Weldrok core. Approved by Underwriters' Laboratories for Class "B" openings in vertical shafts and Class "C" room and corridor openings. *U. S. Patent Nos. 2593501

WELDWOOD PARTITION PANELS

Versatile hardwood-faced partition panels simplify subdivision of space in classrooms and offices; can be used as low-railing, 7-foot and full ceiling height partition.

Fire-resistant mineral core is same as used in Weldwood Fire Door.

Sound reduction rating of 37 decibels means the Weldwood Partition is *twice as effective* in cutting noise as 2 x 4 stud partition with metal lath and plaster both sides.

For FREE Booklets and Specifications, write

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-54, 55 West 44th St., New York 36, N.Y.

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-54, 55 West 44th St., New York 36, N. Y.

ARMORPLY CHALKBOARD

Perfect writing surface takes chalk beautifully without chalk "squeal" or chatter. Easily and quickly erased with standard erasers.

Nature's color—restful Chlorophyll Green—is used for maximum readability; tests show it's the best background color for chalk ever devised.

Magnets stick to porcelain-on-steel* face making your chalkboard a bulletin board, too! Permits easy posting of papers and visual aids.

Cannot break or shatter under impact, stress, temperature changes or concussion; will not warp or buckle.

Guaranteed for life of the building in which it is installed, Armorply *never* needs replacement or refinishing. First cost is last cost!

**Porcelain enamel surface produced by The Bettinger Corp.*

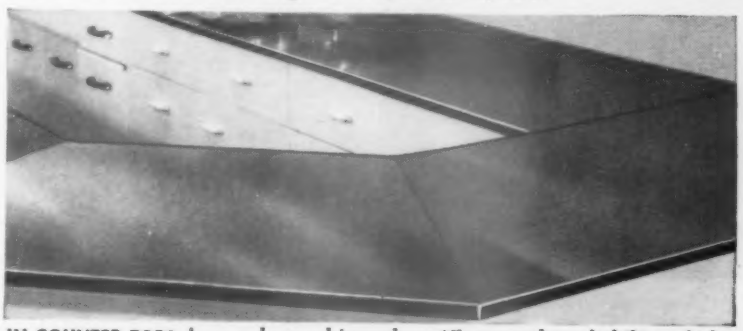


FRAMELESS installation of Armorply Chalkboard fits modern classroom décor in Fairlawn Junior High School, Fairlawn, N. J.

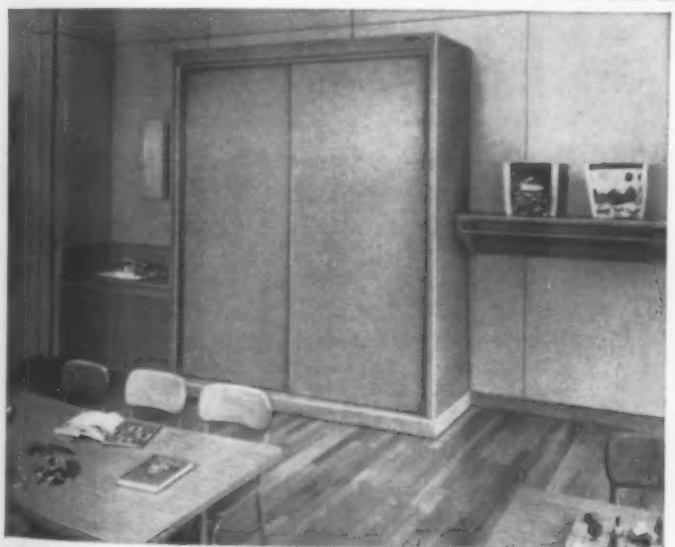
ARMORPLY COUNTER TOPS

Top surface of easy-to-clean stainless steel bonded to Weldwood Plywood makes an ideal counter top or work surface for cafeterias and laboratories.

Less expensive to install because it's easy to work with, Armorply also saves on material costs since the Armorply process uses less costly thin-gauge metal.



IN COUNTER TOPS Armorply combines the stiffness and workability of plywood with the durability and toughness of metal.



SLIDING CABINET DOORS and classroom walls of Novoply are used throughout the Unqua School, Massapequa, Long Island, N. Y.

NOVOPLY®

Low-cost Novoply is the most dimensionally stable wood panel ever produced! It's practically warp-free.

Its tough, hard surface cuts maintenance costs . . . stands up to years of rough-and-tumble treatment anywhere in the school.

Easily installed, Novoply panels speed up building schedules for wall paneling, cabinets, wainscoting, wardrobe doors, table tops, partitions, built-ins, even furniture.

Novoply is perfect for either new construction or a modernization program geared to new school beauty at low cost.

For FREE Booklets and Specifications, write

UNITED STATES PLYWOOD CORPORATION

Dept. ASU-54, 55 West 44th St., New York 36, N. Y.

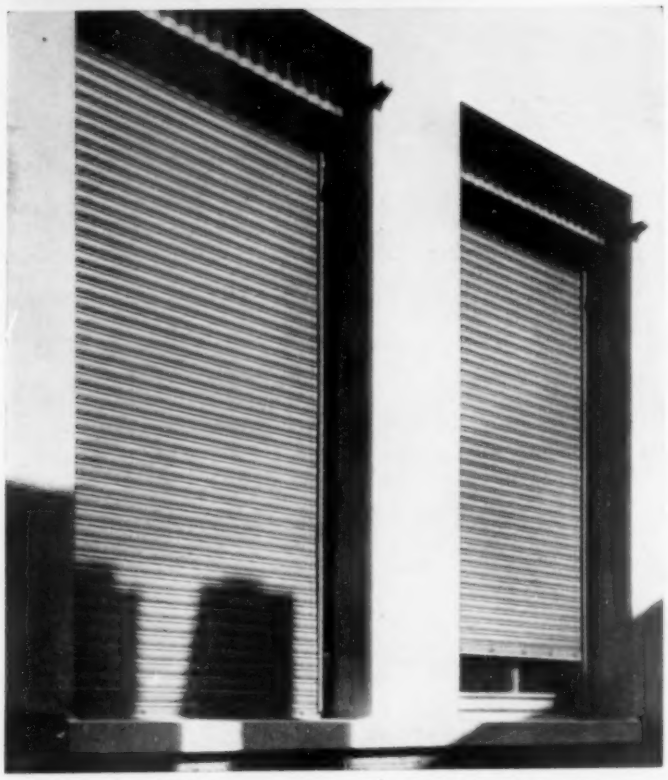
THE KINNEAR MANUFACTURING CO.

1760–80 Fields Ave., Columbus 16, Ohio

FACTORIES
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Avenue, San Francisco 24, Calif.

BRANCH OFFICES in New York, N. Y.; Chicago, Ill.; Boston, Mass.; Philadelphia, Pa.; Detroit, Mich.; New Orleans, La.; Cleveland Ohio; Cincinnati, Ohio; Baltimore, Md.; Pittsburgh, Pa.; and Washington, D. C.

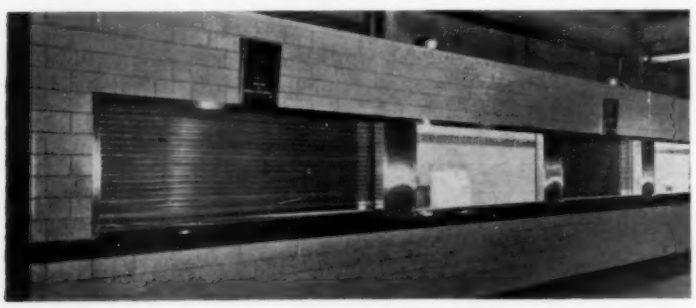
KINNEAR ROLLING DOORS and GRILLES



Underwriters Labeled Fire Doors—Suited also for Service Use

PRODUCTS—Wood or Steel Rolling Service Doors, Automatic Fire Doors and Shutters, Metal Rolling Grilles, Wood Rolling Partitions and Wood or Steel Upward-Acting Doors.

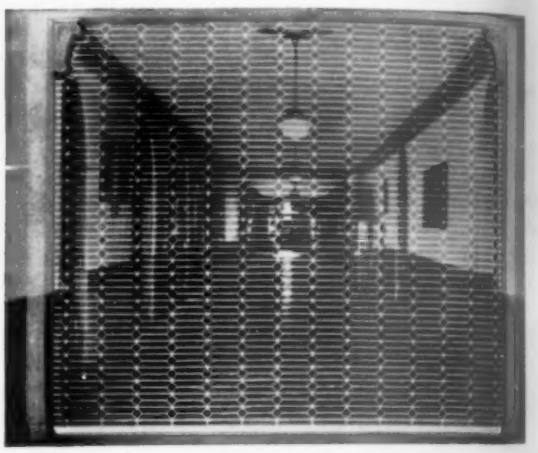
GENERAL—The Kinnear Manufacturing Company pioneered and have devoted their entire effort for the past half century to Rolling or Upward-Acting type Doors and Grilles. They have established the reputation throughout the world as specialists in doors that save floor and wall space, operate more conveniently, reduce maintenance expense through unusual durability and that can be built for old or new buildings for inside or outside use.



Ideal for closing of lunch counters, etc.

Service Doors or Labeled Automatic Fire Doors *for doorways or windows*

Kinnear Rolling Doors are composed of a metal curtain which coils above the lintel, similar to a window shade. They can be installed either on the face of the wall or between the jambs when concealment of the mechanism is desired. Springs provide perfect counterbalance. They can also be operated manually, mechanically, or electrically. Kinnear Fire Doors, though suitable for service purposes, are "labeled" and equipped with mechanism for automatic closure in case of fire. To insure maximum fire protection they are equipped with an auxiliary push-down spring to insure positive closure; a governor for controlling speed of curtain closure; and other features in excess of the requirements of the Underwriters' Laboratories. Their superior design has proved its worth in many major conflagrations.



Grilles for closing corridors to the public

METAL ROLLING GRILLES—Operating on the same principle as the Rolling Door, the Kinnear Rolling Grille is a permanently installed and attractively designed barrier that is remarkably strong when closed and locked, but out of sight when opened. When down, it admits air and light, and does not obstruct vision, making it particularly applicable to all types of interior and exterior openings as well as hallways in school buildings. The grille proper is artistically designed of steel bars spaced close enough to prevent the admittance of large projectiles or a man's hand. The Kinnear Rolling Grille may be mounted on the face of the wall with brackets and coils entirely above the bottom of the lintel and with edges of guides flush with the face of opening jambs; or where headroom is limited and grille cannot be installed on the face of the wall it may be mounted in the opening.

THE INTERIOR STEEL EQUIPMENT CO.

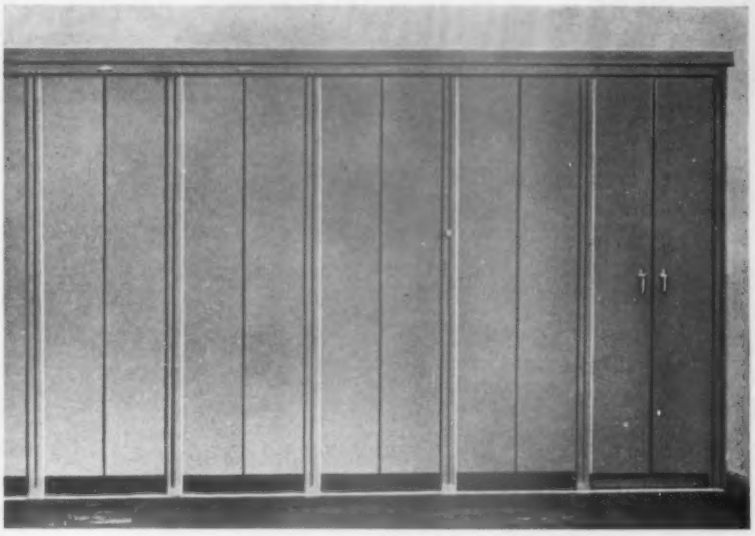
2351 E. 69th. St., Cleveland 4, Ohio

INTERIOR STEEL BUILT-IN CLASSROOM WARDROBES



Showing wardrobe with detail of individual space.

Interior Steel "Disappearing Door" Pupils' Wardrobes offer the practical solution to architects and school officials for an efficient, safe and sanitary method of housing the clothing of elementary school pupils. Available in two types—Recessed (Type RF) and Non-Recessed (Type NF).



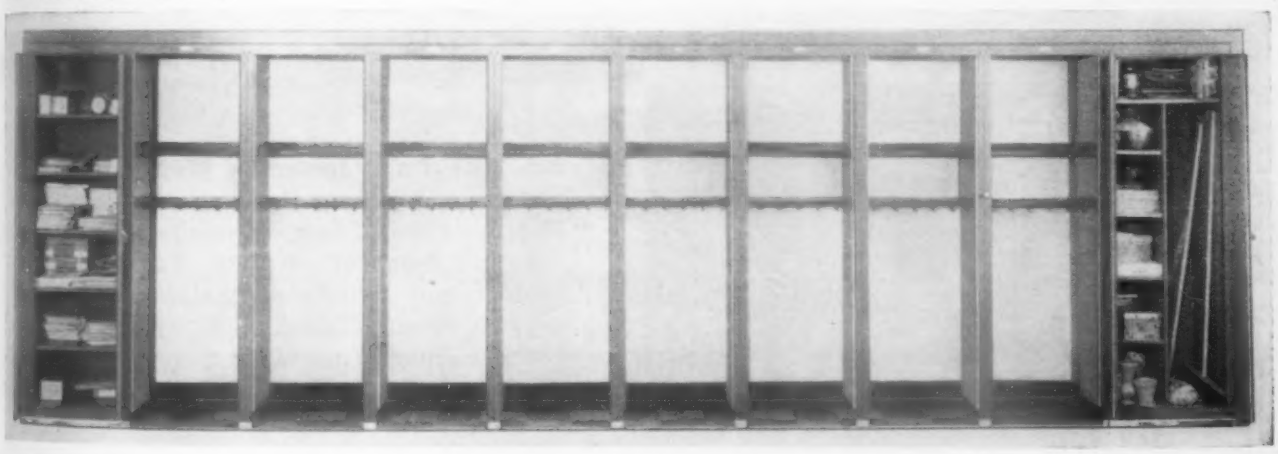
Showing wardrobe with doors closed

Featuring—Automatic Door Closing Control
No Obstructed Aisles
Quiet Operation
Neat Flush Appearance

These Wardrobes are designed to afford maximum utility in units 24" wide, to accommodate up to six pupils in each unit. Units can be grouped in any specified number for a particular room. Units can be furnished in any desired combination of Wardrobes and auxiliary cabinets such as Supply Cabinets, or Combination Teachers Cabinets and Bookcases. The hat and coat racks are continuous across the entire Wardrobe. The lower shelf of the rack is provided with six double prong hooks for each unit. Racks can be installed to wall at different heights for different grades. The shelf space on racks is ample for pupil's hats, books or lunch boxes.

Write for literature with complete Specifications.

Showing wardrobe with doors open.



RICHARDS-WILCOX MFG. CO.

750 Third Street, Aurora, Illinois

R-W Partitions and Wardrobes

Designed for maximum

Better three ways

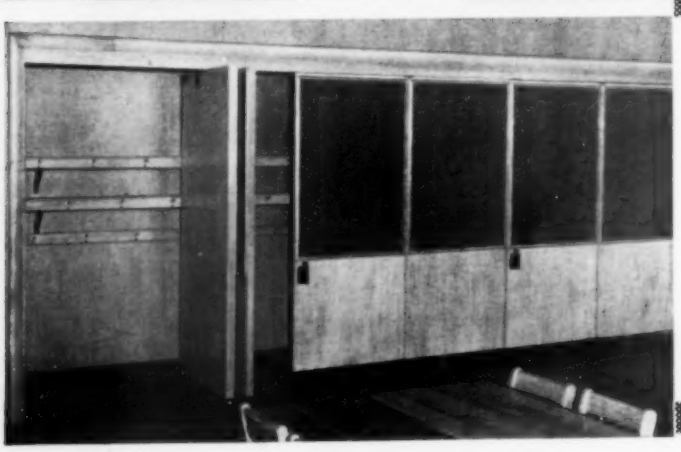
Richards-Wilcox Wardrobes



No. 883 Multiple Operation Wood Wardrobes—This installation features quick, easy, simultaneous operation of all doors in the series. Through an improved design in the top and bottom pivots, the pupils' wardrobe doors may be kept in perfect alignment. Heavy top and bottom pivot units can withstand the hardest usage, keeping the doors working efficiently, noiselessly and smoothly.



No. 780 Receding Door Wood Wardrobes—Pupils' doors, operating individually, slide silently into the recess with ease. The long offset top and bottom pivots joined together in a single unit by a steel connecting shaft, make the No. 780 pivot arm unit the heaviest, sturdiest and most rigid wardrobe operating unit ever produced. No floor track is used, the entryway is completely unobstructed—operation is convenient, easy, practical.



No. 781 Pair Operation Wood Wardrobes—Doors open in pairs, leaving a free, easily accessible entryway. Pair operation acts on heavy duty ball bearing floor pivot. Pair operation also protects any writing on chalkboards. Efficient, smooth, easy operation. Simplicity of design and precise adjustments make this wardrobe exceptionally easy to install and unusually low in cost.

flexibility, convenience and safety

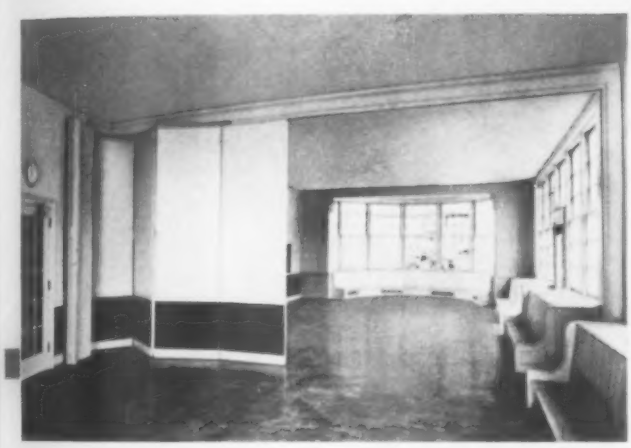
For safe, convenient, practical service, specify

R-W FoldeR-Way Partitions





FOR GYMNASIUMS—R-W Deluxe Fully Automatic FoldeR-Way Partitions—Designed for efficient service in gymnasiums and other large openings, this partition is 100% electric, completely automatic. Opens and closes with a flick of the switch—folds, unfolds, locks, unlocks and soundproofs without requiring any manual assistance.



FOR CLASSROOMS—R-W Manually Operated Sound-Retarding Partitions—In smaller openings, when manual operation is preferred, this partition gives perfect performance. Its method of construction and ease of operation promote complete utilization of all available space — give rooms greater flexibility and adaptability. Installed without floor guides or tracks—permits complete use of floor space. Improves effectiveness by using sound retarding doors having a laboratory tested decibel rating.

Write for further information

1880 RICHARDS WILCOX R-W AURORA TRADE MARK Reg. U. S. Pat. Off. 1952

OVER 72 YEARS

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A. *Branches in all principal cities*

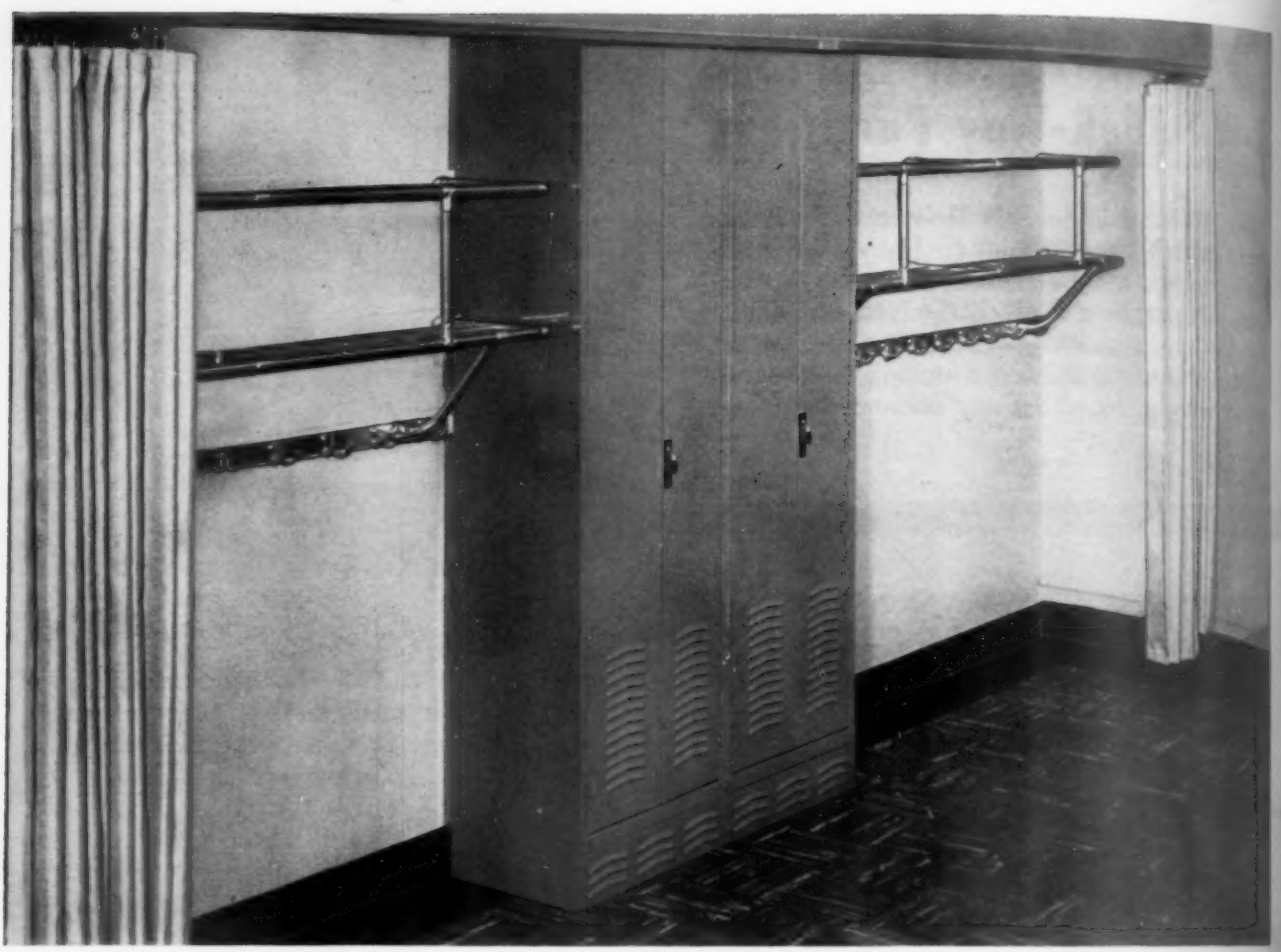
SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS
ELEVATOR DOOR OPERATING EQUIPMENT

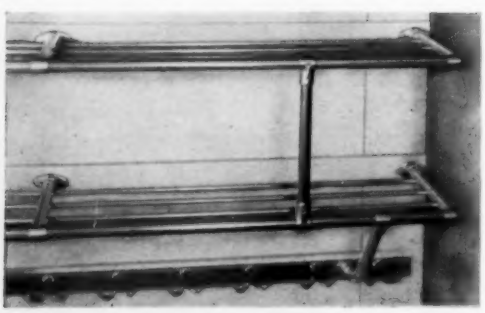
A. R. NELSON COMPANY, INC.

210 East 40th Street, New York 16, N. Y.

A NEW LOW COST WARDROBE

Practical, Easy to Install





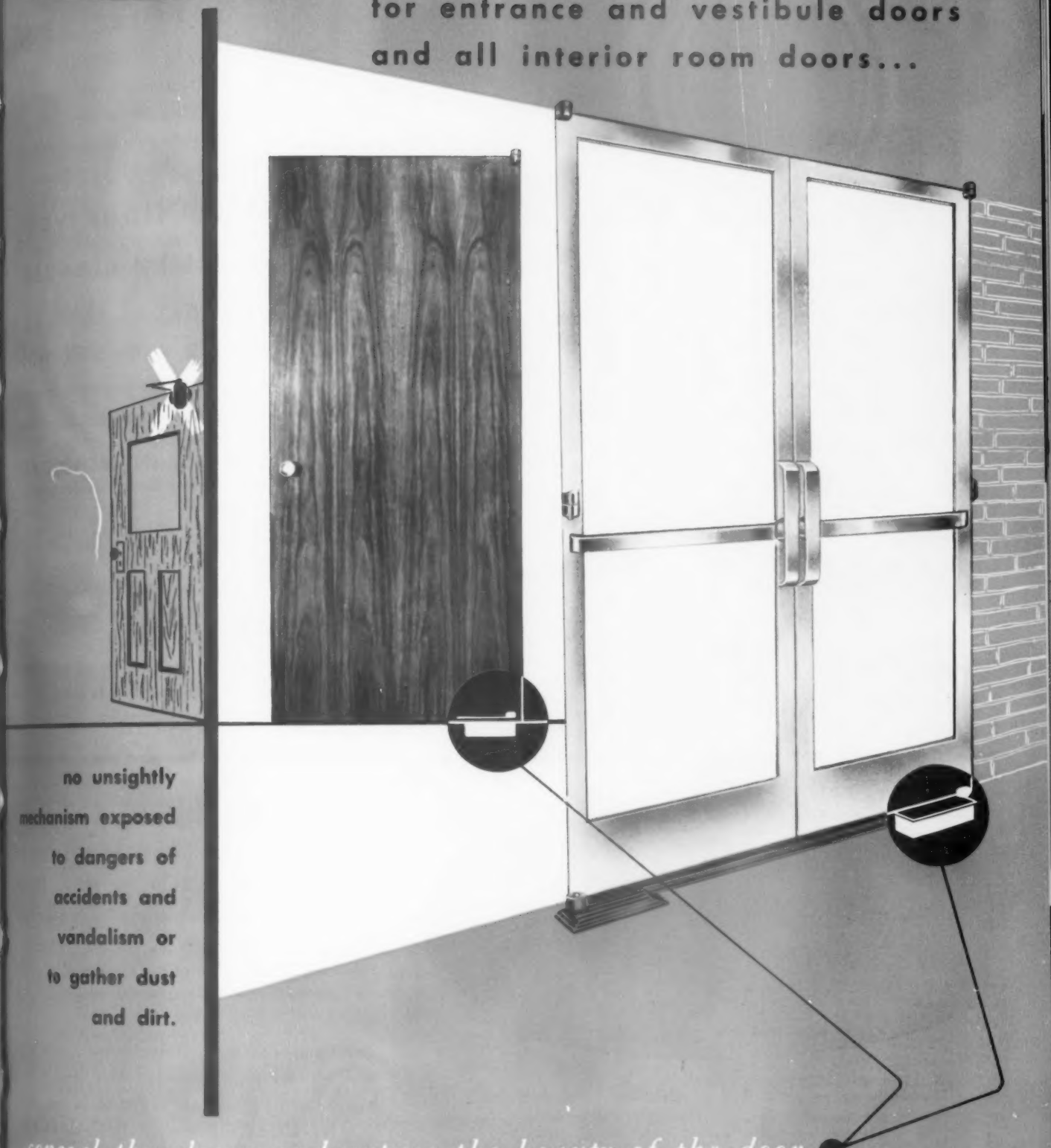
ARNCO ENGINEERED

• This smart, compact, easy-to-install coat and hat rack . . . which is finely engineered in non-peeling alumilite finish . . . represents the *last word* in practicality . . . especially when combined with the spacious teacher's wardrobe and supply closet and smooth, fire-proof Fiberglas gliding curtaining. For further information regarding this good-looking, space-saving wardrobe. . . . *Write for literature today.*

for the modern school, specify

RIXSON concealed DOOR CLOSERS

for entrance and vestibule doors
and all interior room doors...

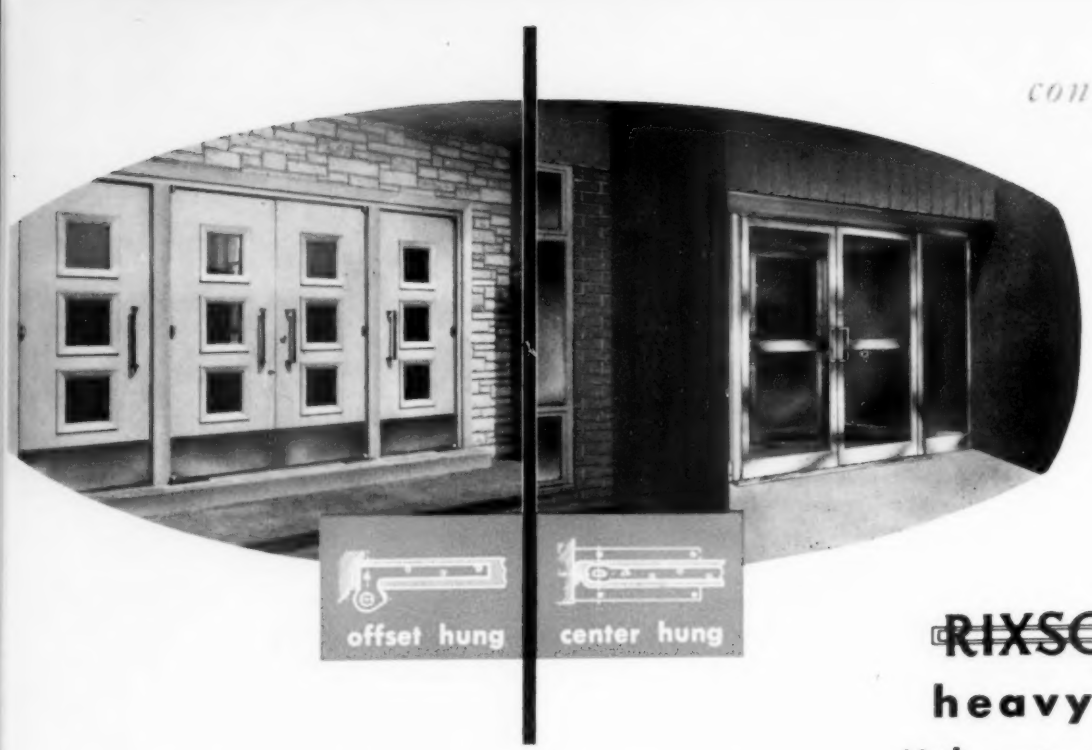


no unsightly mechanism exposed to dangers of accidents and vandalism or to gather dust and dirt.

conceal the closer and expose the beauty of the door

RIXSON floor type closers are firmly installed in the rigid floor

conceal the closer an



for MODERN entrance doors and vestibule doors these heavy duty closers are preferred:

single acting doors: no. 25 offset hung • no. 26 center hung • no. 326 butt hung.

double acting doors: no. 40 center hung.

for schools with lighter entrance doors not over 2' 10" wide these smaller closers are often used:

single acting doors: no. 20 offset hung • no. 21 center hung • no. 321 butt hung.

double acting doors: no. 30 center hung.

for MODERN Stairwell, Auditorium, Gymnasium, and Cafeteria entrance doors:

single acting doors not over 3' 6" wide: no. 20 offset hung • no. 21 center hung • no. 321 butt hung.

single acting doors under 3' wide: no. 18 offset hung no. 18½ center hung • no. 318½ butt hung.

double acting doors: no. 30 for doors not over 3' 6" wide no. 40 for larger, heavier doors.

RIXSON floor type heavy duty closers "the strongest of them all"

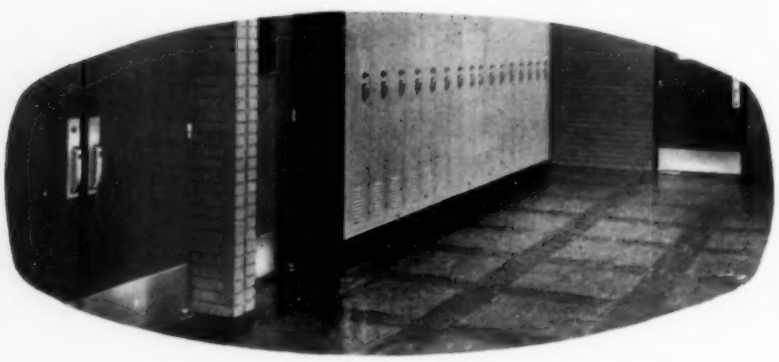
FIRMLY INSTALLED in the RIGID FLOOR

Allows full opening of door—no obstructions.

Will not gather dust or dirt. Cannot be tampered with.

SELECTIVE BUILT-IN HOLD-OPEN
Available in all Heavy Duty Closers except Nos. 18, 18½ and 318½.

A Selective Hold-open will be built in at the factory to hold the door at a predetermined degree of opening. Just specify "with selective hold-open" and degree door is to be held. When the selector is set at hold-open, the door is held when it reaches the hold-open position. When "selector" is set out of hold-open the closer functions normally to bring the door to a quiet close after each opening.



The **single acting UNI-CHECK** is widely used for modern classroom doors. Also office, toilet room and other interior doors.

The **DUO-CHECK** meets the requirement of some cities for double acting classroom doors. They are also used for cafeteria and kitchen doors.

RIXSON floor type closers for interior doors

FIRMLY INSTALLED in the RIGID FLOOR

Allow trim, neat, modern appearing corridors showing no unsightly devices.

Eliminate the hazards of accidents and tampering. No exposed arms or mechanism to gather dust or dirt.

Cost no more for over-all installation . . . offer longer wear with minimum maintenance.

built-in hold-open available on both UNI-CHECKS and DUO-CHECKS

A hold-open is built in at the factory. Just specify "with hold-open" when ordering.

expose the beauty of the door



every school door should be under the *safe control* of a RIXSON closer

For SAFE CONTROL of school doors . . . the closers must be designed for extremes of usage. The resistance to the opening action must be sufficiently gentle so that even a frail child can open the door easily. Yet that resistance must also retain complete control of the door when the "line plunging" youngster goes into action.

Rixson Closers are ruggedly built by precision methods to meet these dual requirements . . . gently and firmly bringing the door to a quiet rest at closed position. Specify RIXSON throughout. There's a RIXSON Closer to suit every exterior and interior door requirement.

SINGLE ACTING • offset type
no. 18 • no. 20 • no. 25 (handed)

Entire weight of door is carried on the spindle supported by ten 9/32" chrome steel Ball Bearings. A top pivot (and on heavy or wide doors, a side jamb pivot) keeps the door in alignment.

Single acting closers nos. 318½ • 321 • 326 available for use with standard hinges.

SINGLE ACTING • center hung
no. 18½ • no. 21 • no. 26 (handed)

No hardware shows on this completely concealed type of installation. Widely used on battery of doors with no mullions . . . effecting an economy of space. The two larger sizes available for glass door installations.

DOUBLE ACTING • center hung
no. 30 • no. 40

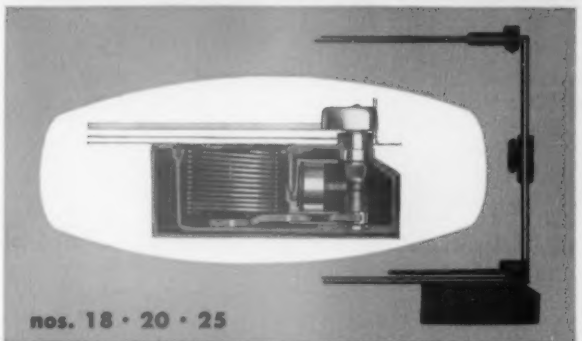
For doors swinging both ways. Hardware completely concealed. Double springs and double hydraulic cylinders make it completely adjustable to varying "in and out" wind and air conditioning problems. Also available for glass doors.

SINGLE ACTING • offset type
UNI-CHECK • nos. 65 • 66 • 67 • 68

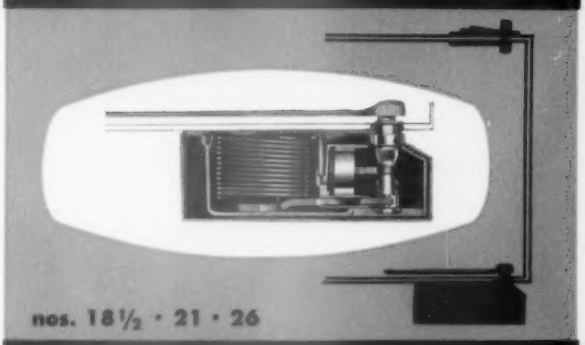
The modern concealed checking device for interior doors. Gentle, uniform, silent closing action. Supplied with built-in hold-open if desired. Requires small floor area . . . only 2 9/16" deep. Ruggedly built for long, continuous, trouble-free action.

DOUBLE ACTING • center hung
DUO-CHECK • nos. 10 • 12 • 15 • 16

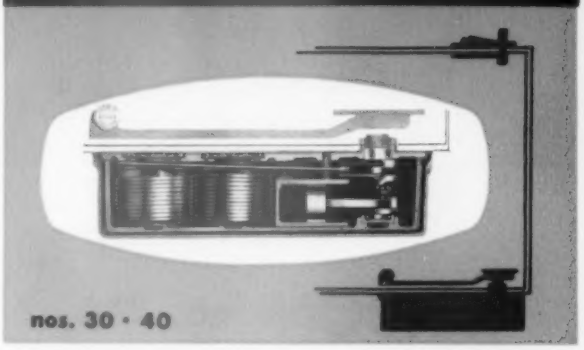
For interior doors swinging both ways. Completely concealed . . . allows a trim, neat, modern appearance. Requires very little floor area or depth. Available with automatic hold-open if desired.



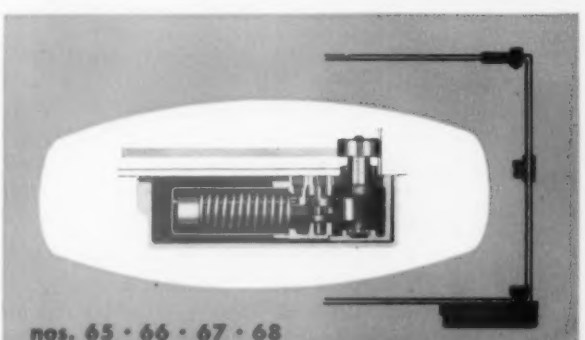
nos. 18 • 20 • 25



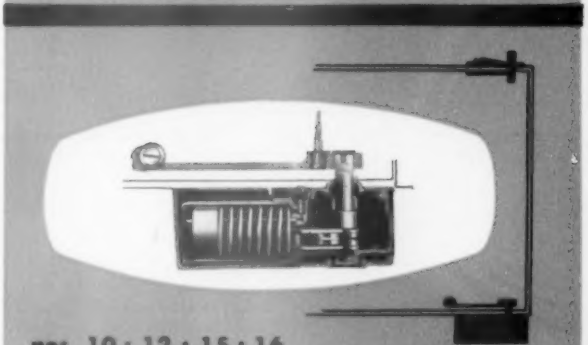
nos. 18½ • 21 • 26



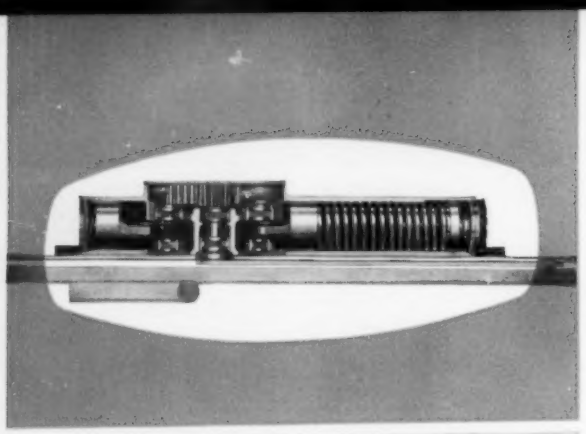
nos. 30 • 40



nos. 65 • 66 • 67 • 68



nos. 10 • 12 • 15 • 16





RIXSON

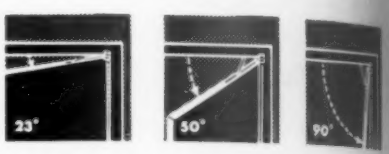
where OVERHEAD installations **are necessary RIXSON nos. 218½ • 221 • 226 for center hung installations and nos. 218 • 220 • 225 for doors hung on hinges.**
Each a compact powerhouse, only 2⅞″ wide x 2¾″ high x 17″ long. Ideal where head jamb is shallow and narrow.

For entrance and vestibule doors nos. 225 and 226 are recommended when overhead closers are specified. Nos. 220 and 221 widely specified for stairwell doors, gymnasium, and auditorium doors. Nos. 218 and 218½ often used to control classroom and office doors as well as toilet room doors.

AUTOMATIC 3 point HOLD-OPEN for classroom doors...

RIXSON no. 37 DOOR HOLDER

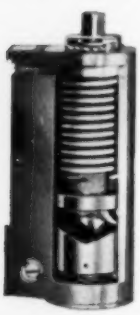
holds the door open automatically at 23°, 50°, and 90°



Used with the RIXSON UNI-CHECK closer . . . makes the ideal door control combination for classroom doors. Holder quietly released by a sharp push of the door, either way. Write for full description and details.

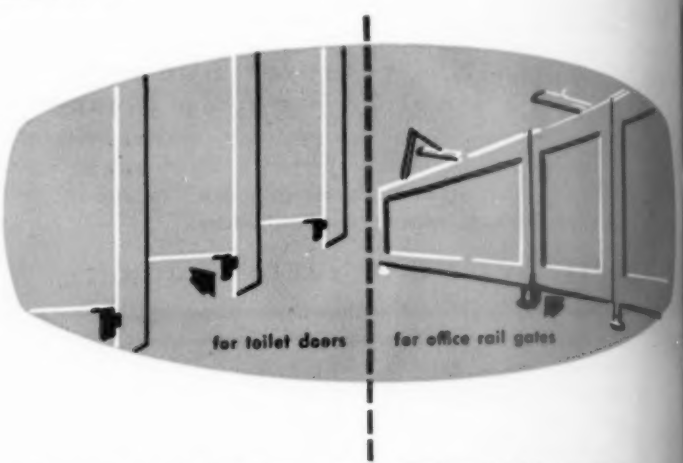
RIXSON no. 350

single and double acting checking pivot hinges



Closes office rail gates automatically—no flip-flap. Brings gate to a quiet rest at closed position. Eliminates noise of free swinging. Available in a variety of pivots, arms, and brackets to suit any style of office rail installation.

For safe control of lavatory stall doors. Prevents violent swinging or slamming of doors. Can be set to bring door to a closed position—or to hold door ajar when not latched.



THE OSCAR C. RIXSON CO.

9100 w. belmont ave. • franklin park, illinois

Write direct for complete templates or contact your local RIXSON representa

originators of floor type door closers

RIXSON

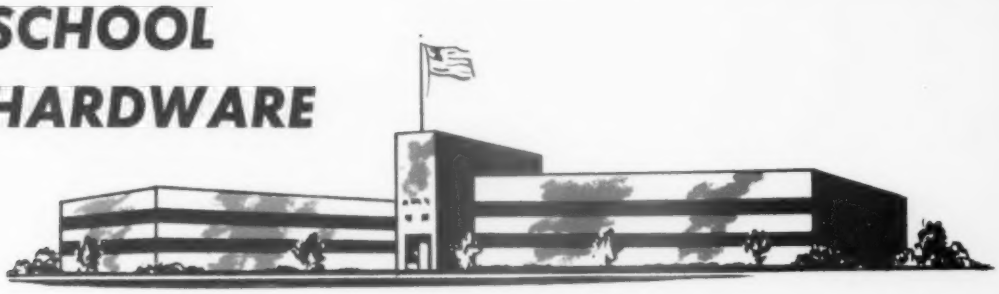
. . . quality hardware for 55 years.

ATLANTA, GA.	Glenn D. Robertson, 4210 Club Drive, N.E., Phone: Exchange 0130
LOS ANGELES, CALIF.	Russell and Whiteside, 5311 E. Beverly Blvd., P.O. Box 6732, Phone Raymond 3-4080
SAN FRANCISCO, CALIF.	John P. Whitty, 1030 Arlington Blvd., El Cerrito, Phone: Landscape 4-5834
SEATTLE, WASH.	S. G. Kirkland, 845 Bellevue Ave., N., Phone: East 8855
NEW YORK, N. Y.	Fred G. MacKenzie, 107 Reade St., Phone Barclay 7-4853
PHILADELPHIA, PA.	G. Norris Williams, 211 Greenwood Ave., Wyncote, Pa., Phone: Ogontz 1929
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HONOLULU, T. H.	B. F. Schoen, Ltd., P. O. Box 3464, Phone: 82284

YALE ALUMINUM



SCHOOL HARDWARE



In the long trend from the little red schoolhouse of yesterday to the modern school, architecture has emphasized the combination of function and beauty.

Yale design has kept pace with this trend by stressing these same two qualities. As a result YALE & TOWNE School Hardware embodies a functional excellence and a simple beauty which is entirely in keeping with the modern school structure.



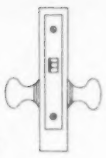
YALE MORTISE LOCKS and LATCHES



STANDARDIZED MORTISE LATCH
Front: 8" x 1¼"
Backset: 2¾"
Case: 5¾" x 3⅞" x ¾"

A.

8000 PASSAGE LATCH
Government Type No. 86N



Operation—Plain latch bolt by knob from both sides.

A1.

8032 FIRE EXIT LATCH
Government Type No. 87N



Operation—Deadlocking latch bolt by knob inside only. The bolt has ½ inch throw when door is open; the action of closing the door causes the second throw to project, thus giving the bolt a throw of ¾ inch when door is closed. Suitable for doors to fire escapes.

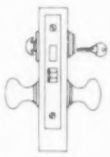
A2.



STANDARDIZED MORTISE LOCK
Front: 8" x 1¼"
Backset: 2¾"
Case: 5¾" x 3⅞" x ¾"

B.

8660 UTILITY, CLOSET OR PASSAGE LOCK
Government Type No. 86B



Operation—Latch bolt by knob from both sides. Dead bolt by key from outside, by turn knob from inside.

B1.

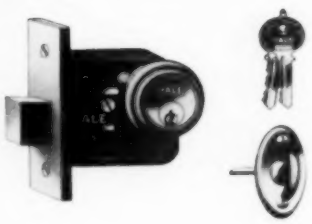
8535 BATHROOM LOCK SET
Government Type No. 86L



Operation—Deadbolt by turn knob from inside only.

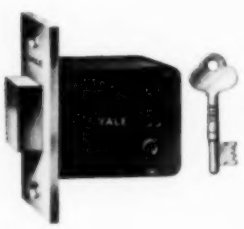
B2.

YALE DEADLOCKS



C.

325 DEADLOCK
Government
Type No. 190K
Front: 4" x 1 1/16"
Backset: 2½". Also 2¾"
Case: 2½" x 3⅞" x 13/16"



D.

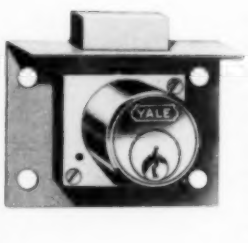
297 ASYLUM MORTISE DEADLOCK
Front: 5¼" x 1⅛"
Backset: 2¾"
Case: 2⅞" x 3½" x 13/16"



E.

278 ASYLUM MORTISE DEADLOCK
(278 with standardized strike —Govt. Type No. 192)
Front: 5½" x 1¼"
Backset: 3"
Case: 3" x 4 1/16" x ⅞"

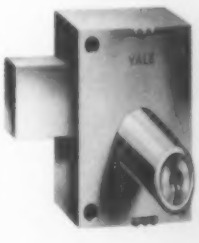
YALE DOOR, DRAWER and CABINET LOCKS



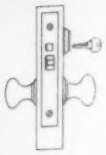
5591

3-WAY DESK AND CABINET LOCK
PIN TUMBLERS
Government Type No. 910

Same lock can be used in three different positions. Changed from drawer lock to right or left hand by releasing a catch and rotating cylinder.
Application: Half Mortise. For ⅞", 1⅛" or 1⅜" wood or metal drawers and cabinets.
Operation: Deadbolt.
Material: Brass — Available with satin chrome plated face and cylinder to blend with other aluminum hardware.



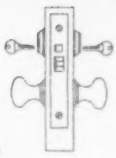
8648
UTILITY, CLOSET OR EXIT LOCK
Government Type No. 86EW



Operation—Deadlocking latch bolt knob from inside only. No stop work in front. Outer knob is pinned fast and serves as pull in closing door. Latch bolt is retracted by key from outside. Bolt can always be retracted by key from outside or knob from inside.

A3.

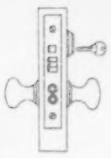
8737-¼
FIRE EXIT LOCK
Government Type No. 87G



Operation—Deadlocking latch bolt with ¾ inch throw by knob from both sides except when outside knob is set by key through inside cylinder. When outside knob is stopped, bolt can be operated by key only from outside and knob from inside. Bolt always can be retracted by key from outside or knob from inside.

A4.

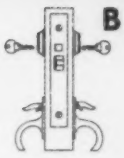
8656
OFFICE OR EXIT LOCK
Government Type No. 86E



Operation—Deadlocking latch bolt by knob from both sides except when outside knob is set by stop in front. When outside knob is stopped, bolt can be operated by key only from outside, and knob from inside. Bolt can always be retracted by key from outside or knob from inside.

A5.

8426-¼
ENTRANCE HANDLE LOCK

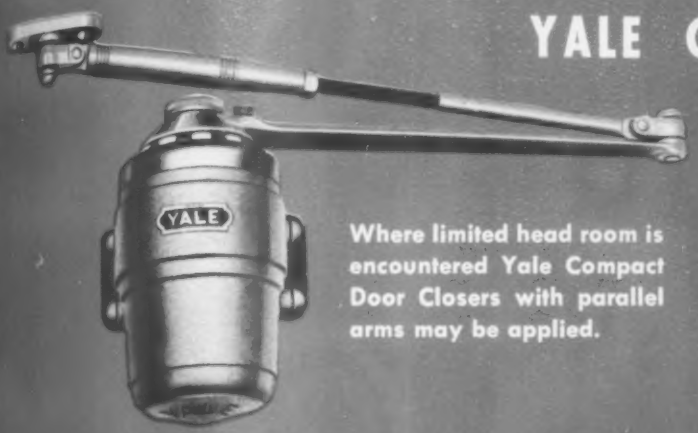


Operation—Deadlocking latch bolt outside by key at all times and by thumb-piece except when thumb-piece is deadlocked by key through inside cylinder. Inside by thumb-piece at all times.

A6.

YALE COMPACT DOOR CLOSERS

Specially designed for SCHOOL USE



PARALLEL ARM DOOR CLOSER

Where limited head room is encountered Yale Compact Door Closers with parallel arms may be applied.

Yale Compact Door Closers are designed for every application where quick, quiet, automatic closing of school doors is desired.

To harmonize with the aluminum hardware, the Compact Closers are similarly finished in aluminum.



REGULAR DOOR CLOSER

Inconspicuous, attractive in appearance, the Yale Compact Series of Closers is engineered for years of hard service under all operating conditions.



FUSIBLE LINK DOOR CLOSER

For fire doors Yale Fusible Link Closers are an important safety measure.

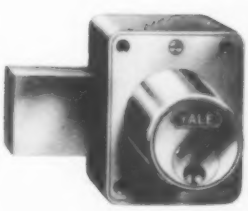
They are listed by Underwriters' Laboratories.

WA120

CABINET LOCK
LEVER TUMBLER
Size: 2" x 1⅛"
Backset: 1⅜"
Throw: ⅜"

Sheets right and left. Material: Brass with heavy brass bolt. Available with satin chrome plated finish to match aluminum hardware.

611



CABINET LOCK
PIN TUMBLER
Government Type No. 957
Size: 2" x 1⅛"
Cylinder: 1⅛" dia.
Backset: 1³⁄₁₆"
Throw: 1"

Material: All brass. Available with satin chrome plated finish to match aluminum hardware.

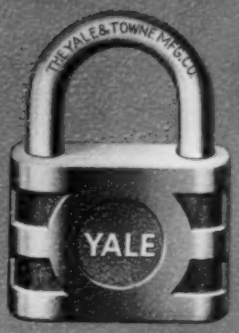
F6100



UTILITY CAM LOCKS

These locks are available in a wide range of sizes with a variety of cam shapes to suit different applications. They are used for metal doors drawers, cabinets and lockers of many different types. Available fitted with a stainless steel scalp to blend with aluminum hardware.

YALE PIN TUMBLER PADLOCKS



840

SUPER PIN TUMBLER PADLOCK

Highest Security — Can Be Master Keyed with other locks which have the same key number. Shackle is case hardened steel. Case is forged brass and polished



774

HIGH GRADE PIN TUMBLER PADLOCK Government Type No. EPB

Heavy Duty Security. Solid... case. Shackle of case ha... steel. Phosphor bronze ...

YALE COMBINATION LOCKER LOCKS and PADLOCKS



589

YALE COMBINATION PADLOCK

Dial and Key Operation: The knob is turned to the right after the last number has been dialed. Closing the shackle automatically deadlocks the bolt and disperses all three tumblers.

Specifications: Body—A die cast unit. Shackle clearance 1". Shackle securely held at heel and deadlocked by hardened steel bolt at toe end.



L3374

LOCKER LOCK FOR LOCKERS WITH AUTOMATIC LATCHING DEVICE

Dial and Key Operation: Combined dial and control key operation eliminates need for consulting records in emergencies or for periodic inspections. All locks in an installation are set to different combinations. Each lock can be changed to 12 different combination settings without removal from the door.

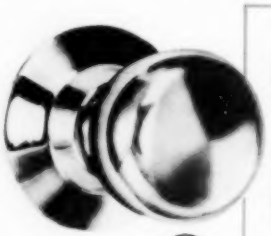


L3378

LOCKER LOCK FOR STEEL, GRAVITY OR MANUALLY OPERATED LOCKERS (⅜" Max. Metal Thickness)

Dial and Key Operation: Control key feature... time and trouble. ... binations are possible... unlimited. Any authorized person can change the combination as often as necessary. Each lock has 12 different combination settings.

NEW 5300 SERIES YALE CYLINDRICAL LOCKSET

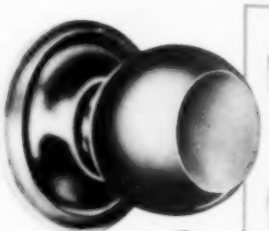


Design Symbol (LF)

LITCHFIELD

Available in wrought brass, bronze and aluminum.





Design Symbol (CL)

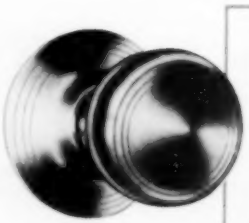
CLASSIC

Available in cast brass, bronze and aluminum.



Yale Engineering has incorporated the most modern time-and-trouble-saving features in these locksets. Each lock is "function-fitted", tailored in its operation to the use of the door on which it belongs.

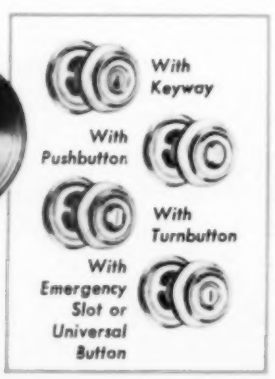
Fingertip push button locking and turn button locking eliminate fuss and fumble. Key-in-knob design facilitates locating keyhole—permits unlocking and opening with a single motion of one hand.



Design Symbol (TR)

TROY

Available in wrought brass, bronze and aluminum.





Design Symbol (NA)

NASSAU

Available in cast brass, bronze and aluminum.



For detailed information on Yale hardware call your local Yale hardware distributor.

YALE & TOWNE

Yale Lock & Hardware Division
YALE & TOWNE MFG. CO.
Stamford, Conn.

GLYNN • JOHNSON corporation

where there's LIFE!



specify GJ hardware for SAFE CONTROL of all SCHOOL DOORS

When eager, exhuberant young people are "on their way" there's not much slowing down to remove obstructions like doors. The force created by a door heaved open with a hearty push can be quite destructive if that force is frequently repeated and if that force is not put under control or absorbed. Walls, reveals, hinges, jambs and door closers soon show signs of wear, distortion, and destruction. Excessive maintenance and repair bills are the result.

Basically GJ door stops and holders were designed to CONTROL the free opening action of doors . . . to absorb the shock and noise of sudden stops . . . to keep doors from striking walls and other obstructions . . . and to reduce door opening action by holding the door open when traffic is heavy as at dismissal time.

Every door holding and door stopping problem . . . including the requirements of a limited school budget . . . can be met with the long wearing, high quality GJ devices shown on the following pages.

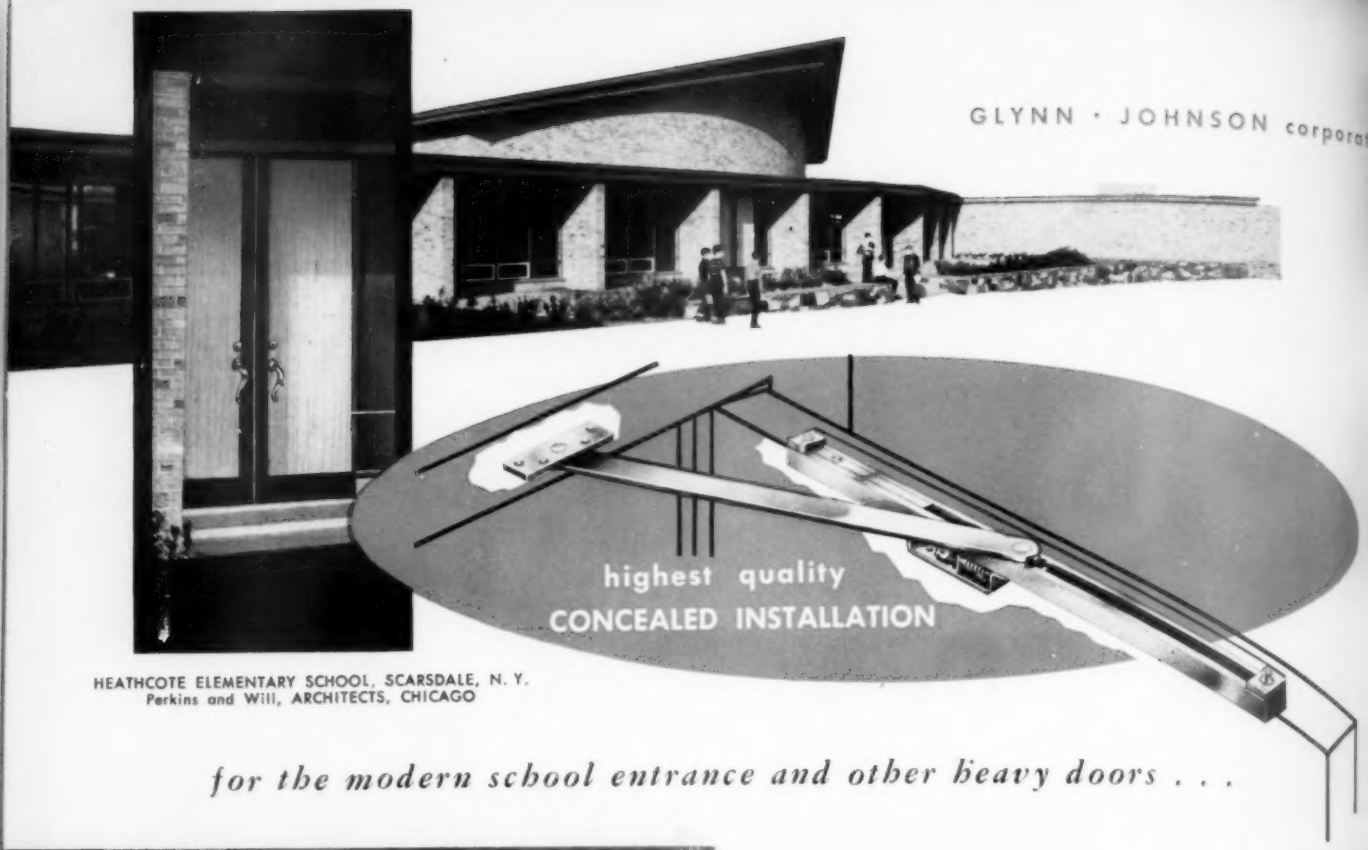
a CUSHIONED STOP for violent openings. Protects wall, door, jamb, closer, and other hardware.



HOLDS THE DOORS at dismissal time . . . eliminates unnecessary wear and abuse.

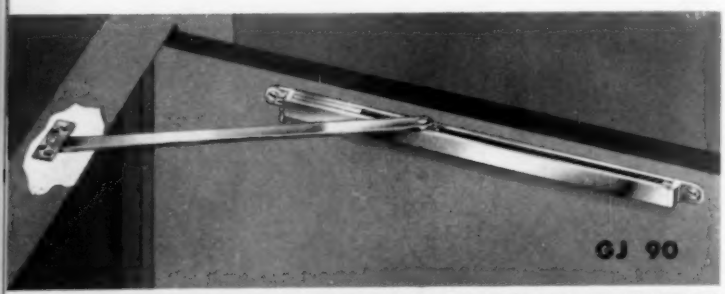
PRODUCERS COUNCIL

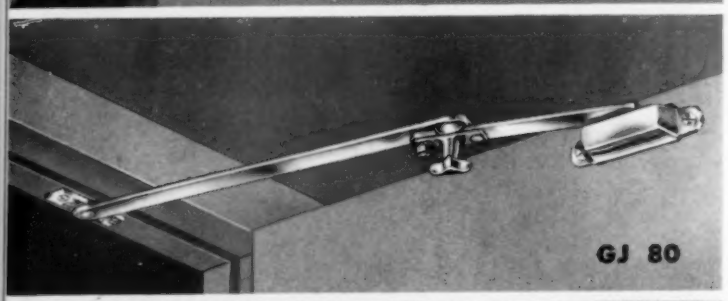
GLYNN · JOHNSON corporation

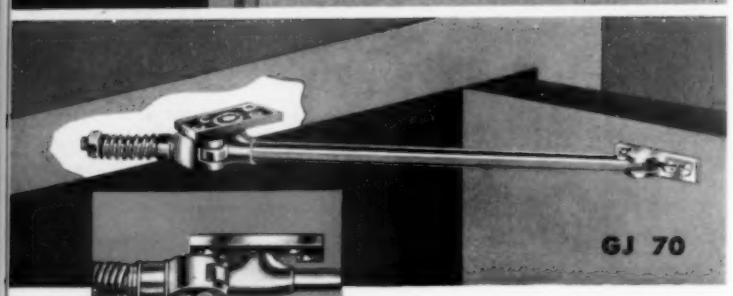


HEATHCOTE ELEMENTARY SCHOOL, SCARSDALE, N. Y.
Perkins and Will, ARCHITECTS, CHICAGO

for the modern school entrance and other heavy doors . . .









with fusible washer

Can be installed in conjunction with surface type door closers.

GJ 100 and 200 concealed overhead door holder, stop, and shock absorber with safety release. For modern single or double acting entrance and vestibule doors. Also gymnasium, auditorium, and all exterior doors. Styles for offset, center hung, and butt hung doors; metal, wood, or all glass. Preferred by architects who strive for the modern appearance achieved by "hidden" hardware.

highest quality SURFACE INSTALLATION

GJ 90 surface type overhead door holder, stop, and shock absorber with safety release. For single acting entrance and vestibule doors. Also gymnasium, auditorium, and all exterior doors. Styles for offset, center hung, and butt hung doors; metal, wood, or all glass. Preferred because it can be installed quickly on new or existing doors.

moderately priced SURFACE INSTALLATION

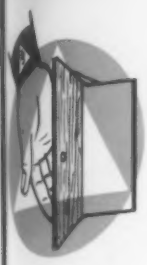
GJ 80 surface type overhead door holder, stop, and shock absorber with safety release. For single acting gymasium, auditorium, and classroom doors. Also lower cost entrance and vestibule installations. Made in three sizes for different door widths and any type of door hanging. Durably made for practical function in moderate cost installations.

low budget SURFACE INSTALLATION

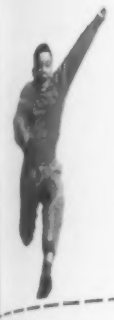
GJ 70 surface type overhead door holder, stop, and shock absorber with safety release. Can be specified for entrance and vestibule doors where the budget is limited. Also other exterior and interior doors.

Made in four sizes for different door widths and any type of door hanging. A low cost, stout, practical device.

latest details and templates of any GJ device . . . AVAILABLE IMMEDIATELY.



GJ OVERHEAD DEVICES offer the utmost in door control, safety, and protection where doors need not be opened beyond 110°.



Entrance doors, vestibule, stairwell, classroom, and all other doors that have student traffic . . . should have the protective advantages of these overhead door stops and holders. Their resilient spring cushions, with their 5° to 7° "give", comfortably absorb the shock and sound of stopping the door. Being overhead, they are out of the way and offer no stumbling or cleaning hazard or invitation to vandalism. They hold the door automatically and have a SAFETY RELEASE for quick closing in emergency.

The styles shown below are variously recommended for different school doors according to the size and function of the door . . . allowing a variation in selection according to individual preferences and school building budgets. They are all manufactured of high tensile strength bronze alloys in all standard finishes.

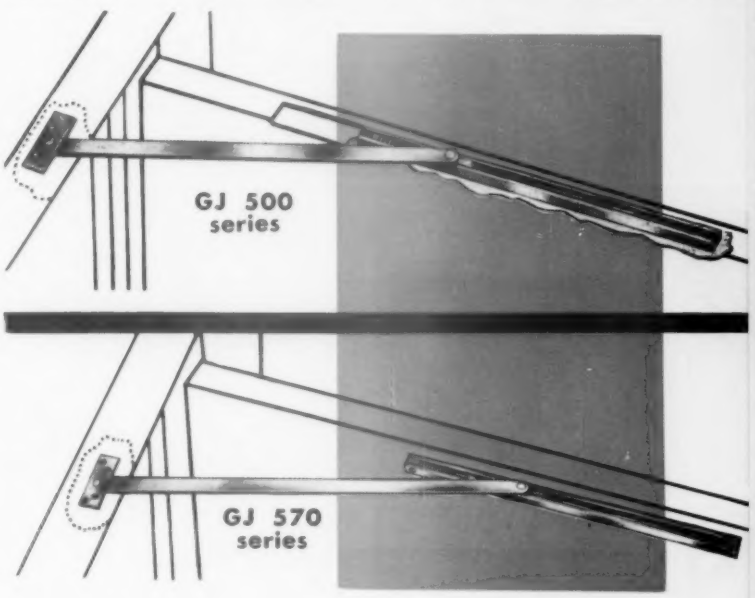
CLASSROOM DOORS and other interior doors should have protection of safe overhead control . . .

Overhead holders are out of the way and cannot be tampered with or cause accidents.

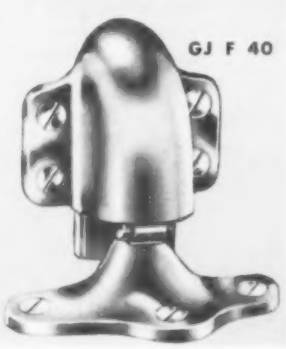
GJ 500 series • CONCEALED INSTALLATION

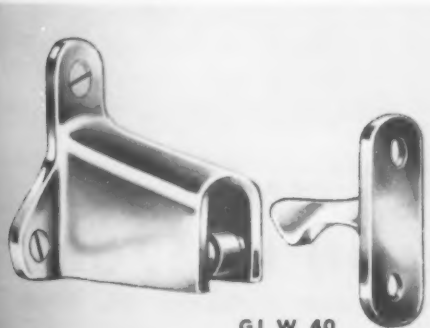
GJ 570 series • SURFACE INSTALLATION

The door is held open and released by a simple push and pull action. The resilient cushioned door stop with its 5° to 7° give absorbs the shock and sound of violent door openings. Made in four sizes for doors of different widths and all styles of door hangings . . . single or double acting. Non-handed.









FLOOR and WALL TYPE door holders and bumpers

for doors opening to a complete 180°

for ENTRANCE DOORS and other exterior doors.

GJ F 9 floor type semi-automatic, functioning as bumper and holder. Hook attached to door slides under engagement tongue and holds until released by pushing door back. Where doors are extra large, the heavier GJ F 10 is recommended.

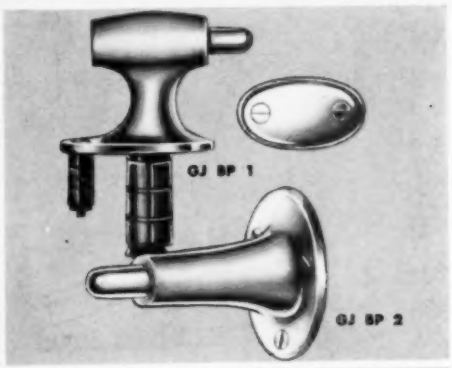
for CLASSROOM DOORS and other interior doors.

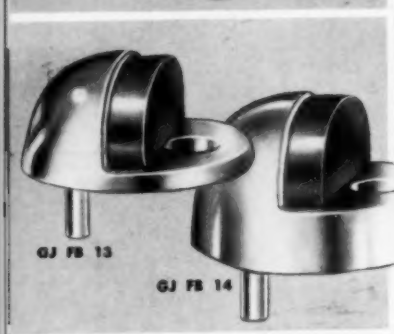
GJ F 40 floor installed. GJ W 40 wall installed. Quiet operating bumpers with push-pull holder and release. Fool proof. Engage on contact, releases by firm pull. The rounded edges prevent children from riding or standing on the holder. The most widely used bumper-holders in school installation.



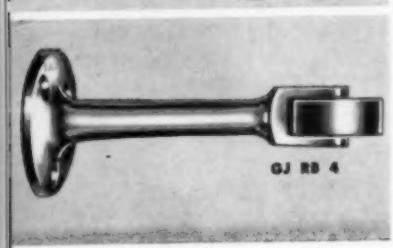
















floor and wall type

door bumpers with holders

GJ F 20 floor installed. GJ W 20 wall installed. Holder and bumper with strike plate hook. Hook is flipped up to engage door. When disengaged, hook falls and "fits" into strike plate.

floor type door holders

Recommended where traffic is light and a door stop is not required. Attached to base of door, holds door open at any position. Rubber shoes grip firmly.

GJ 4 lever action. Highest quality bronze in various finishes and sizes. Also GJ 44 and GJ 444 for lower budget.

GJ 1153 (aluminum) • GJ 1154 (bronze or brass) plunger action. Contact and spring trigger release by foot. Available in all finishes.

floor and wall type bumpers

GJ FB 18 • GJ FB 19 floor type door stops and bumpers. In heights 2⅛" and 2⅜" and for mounting with wood screws or expansion shields. Solid rubber tip.

GJ BP 1 floor type door stop with plunger cushion for absorbing shock. Securely anchored into floor. Heavily built. Furnished with strike plate for door.

GJ BP 2 wall type stop with plunger cushion.

GJ FB 13 • GJ FB 14 dome type door stops and bumpers, floor mounted. Styles adapted to installations without or with thresholds for wood screw, machine screw or expansion shield mounting.

GJ WB 35 extended wall type door stops and and bumpers, 2¾" long with sloping top. All available for either wood screw or expansion bolt installation.

GJ WB 5 flush type wall bumpers to protect knobs, wall and reveals. Available from 1" to 4" diameter, and from 9/16" to 1" projection . . . for screw or toggle mounting. Brass or bronze.

GJ RB 4 roller bumpers. Prevent two interfering doors from striking or their knobs from locking.

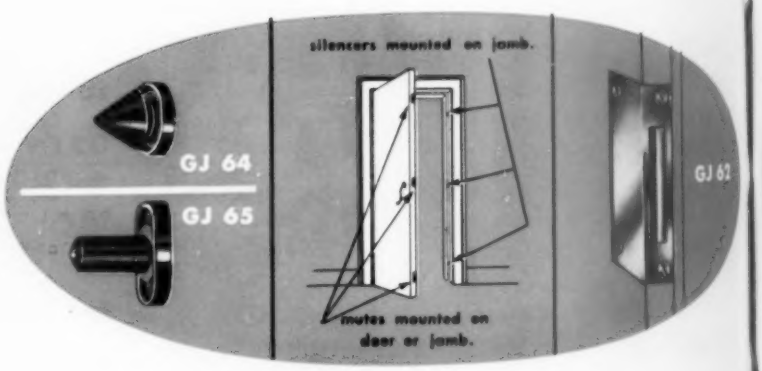
GJ 21A four way catch and GJ 22 two way catch. Ideal for cabinet, wardrobe, and sliding doors. One permanent installation—no repairs or replacement. Ball under spring pressure "pulls" sagging doors into line.

for quiet **DOOR CLOSING . . .**

GJ silencers and mutes hush the noise of slamming doors.

GJ 64 and GJ 65 rubber door silencers
Inexpensive, pneumatic cushions—GJ 64 installed in metal frames, GJ 65 in wood frames—absorbs shock and noise of door closing and eliminates lock rattle.

GJ 62 mutes. Recommended for doors having no door closers. Noise and force of severe slams absorbed, reducing noise and destructive shock.



For further help in specifying or ordering see your local GJ Contract Hardware Dealer and Hardware Consultant or write direct.

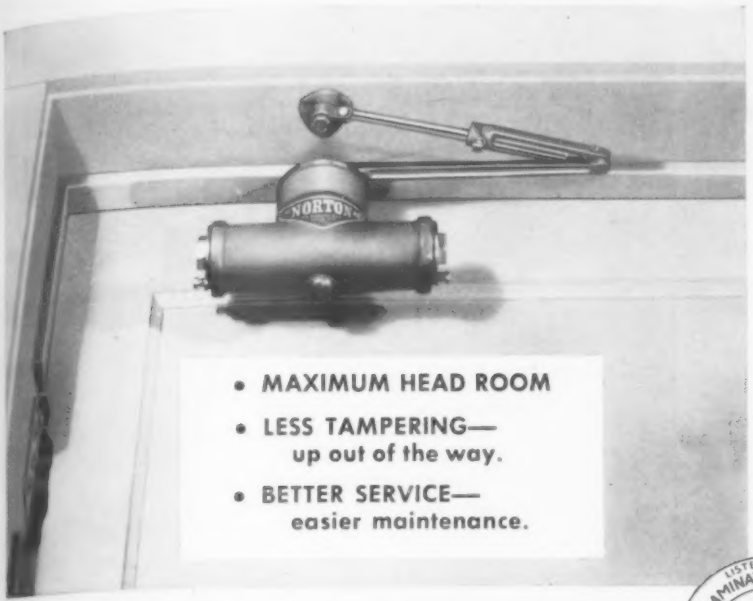
GLYNN • JOHNSON CORPORATION
4422 north ravenswood avenue • chicago 40, illinois

NORTON DOOR CLOSER CO.

Division of The Yale & Towne Mfg. Co.

Berrien Springs, Michigan

NORTON DOOR CLOSERS MEET FEDERAL SPECIFICATIONS F.F.-H-121a



NORTON PARALLEL ARM CLOSERS FOR SCHOOLS

The Norton 90° to 180° Parallel Arm Closer was designed for building detail where low headroom does not permit conventional installation. It is ideal for school use because it eliminates the need for brackets, hence permits maximum head room. It is well out of the way and minimizes handling and tampering. The new Norton Aluminum Shell surface closer has established a record for low-cost maintenance. Five different sizes provide for the lightest to the heaviest types of doors.

For new buildings Norton has perfected a **concealed** closer, the last word in door checking technique. Every Norton Closer carries a 2-year factory guarantee.

ONLY NORTON HAS ALL OF THESE FEATURES

- **ALUMINUM SHELL**—A new and exclusive feature that has established the best "no-service needed" record in our 70 years of making closers.
- **RACK AND PINION**—Guarantees positive control at every point. Easy regulation of closing speed.
- **LEAKPROOF SHAFT AND PACKING NUT**—Equipped with a special synthetic rubber material impervious to oil and other agents.
- **OIL-IMPREGNATED BOTTOM BEARING**—self-lubricating, inserted by force in bottom of shell. Insures dependable, sure action.
- **ANTI-FREEZE OIL CHECKING FLUID**—non-gumming and non-freezing. Provides maximum operating efficiency.
- **SPECIAL STEEL SPRING**—Motor clock-type. Performance-proved by 50 years of use in Norton surface door closers.
- **FOUR TYPES OF ARMS AND 9 BRACKET STYLES**—to take care of virtually every need.
- **TWO SPEEDS OF REGULATION**—on one regulating screw permits easy adjustment for slow or fast closing.

WRITE FOR CATALOGUE

"THERE'S NOTHING LIKE A NORTON!"

70 YEARS OF LEADERSHIP IN DOOR CLOSERS

NORTON FUSIBLE LINK ARM

The Fusible Link Arm, a variation of the regular Norton holder arm, is noted for its simplicity in design and sureness of action as a fire-protection measure. It is approved by the National Board of Fire Underwriters. Norton surface closers are also approved by the Bureau of Standards for Government work under Federal Specifications F.F.-H121a.

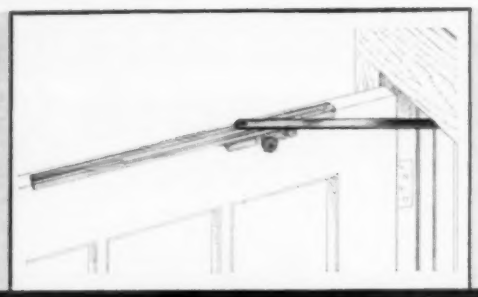


SARGENT & GREENLEAF, INC.

Since 1857

Rochester 21, New York

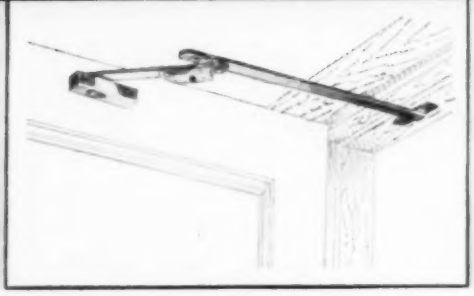
SASH AND DOOR CONTROLS BY—



THE S/G NO. 600 DOOR CONTROL is completely reversible for right or left hand doors. Hold open is set by knob to operate manually or automatically and is adjustable. A free gliding guide aids floor closer control, cushioned stop holds door firmly open.



THE S/G NO. 190 DOOR CONTROL is completely reversible for right or left hand doors. Weep-holes in end block carries water away from door. Hold open is adjustable, may be set for manual or fully automatic operation. One piece channel is fastened directly to door with thru bolts.

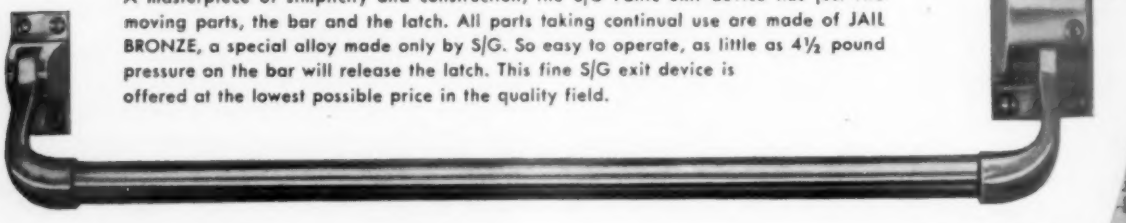


THE S/G NO. 1480 DOOR CONTROL has two exclusive features. First, the adjustable tension of hold open permits easy suiting of holder to draft condition. Second, the encased shock absorber bearing is of fine grained impregnated cherry to resist wear elements. The extra large jamb plate prevents sag of arm.



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PANIC EXIT DEVICES

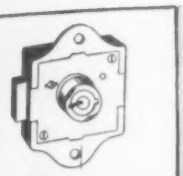


A masterpiece of simplicity and construction, the S/G Panic exit device has just two moving parts, the bar and the latch. All parts taking continual use are made of JAIL BRONZE, a special alloy made only by S/G. So easy to operate, as little as 4½ pound pressure on the bar will release the latch. This fine S/G exit device is offered at the lowest possible price in the quality field.



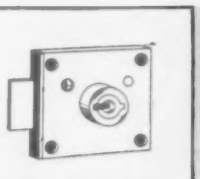
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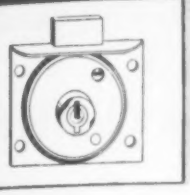
CABINET AND LOCKER LOCKS BY—



No. 820 CABINET LOCK, masterkeyed with Nos. 732, 905, 428 masterkeyed with 15,000 changes —can be furnished not masterkeyed with 750,000 changes.

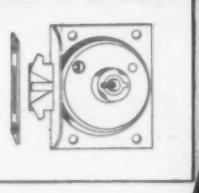
No. 428 WARDROBE LOCK, masterkeyed with No. 732, 905, 820—15,000 regular changes, 2,000 when furnished masterkeyed and with single key slot.





No. 732 CABINET LOCK, masterkeyed with Nos. 905, 428, 820—100,000 regular changes with single key slot, 15,000 changes with double key slot, 2,000 changes when masterkeyed.

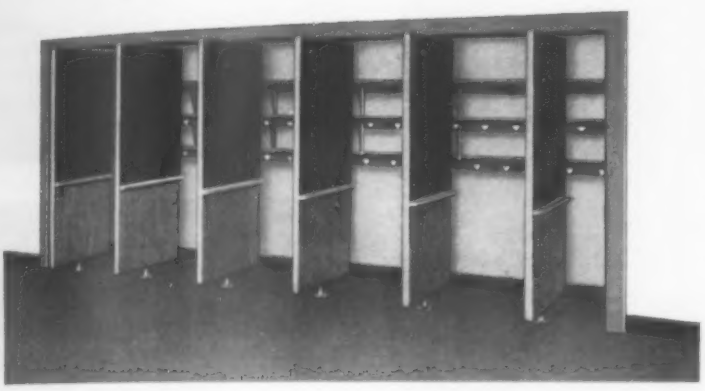
No. 905 CABINET LOCK masterkeyed with Nos. 732, 428, 820—100,000 regular changes with single key slot, 15,000 changes with double key slot, 2,000 changes when masterkeyed.



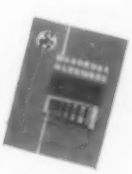


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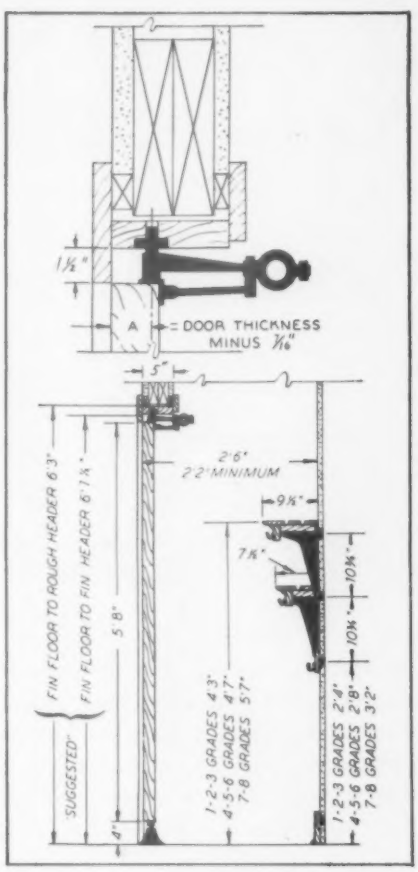
SCHOOL WARDROBE HARDWARE



S/G Wardrobe Hardware is quickly, easily installed by a carpenter and is adjustable to any size door opening. The door operating hardware is entirely overhead, has only two tamper-proof adjustments—for door alignment and height. Ball bearing pivots provide effortless silent operation for life. S/G Hardware offers a safety-plus factor with no carriers, tracks or awkward obstruction to trip over. In addition to life-time economy, simple installation and safety, comparison proves S/G Wardrobe Hardware provides 25% more usable space.



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VONNEGUT HARDWARE CO. • VON DUPRIN DIVISION

Indianapolis, Indiana

Von Duprin

COMPLETE EXIT INSTALLATIONS



No. 27B² Exit Device—For the inactive door. No outside hardware—exit only. Drop-forged for greater strength and wear. Crossbar reinforced by full-width X-Bar. Pullman top and bottom latches operate independently.

No. 23B² Exit Device—For the active door. Companion device of 27B². Outside knob locked by outside key. Doors are push-pull with crossbars dogged.

No. 3246—Compensating Metal Astragal—Extruded architectural bronze. Easily adjusted up to ⅛" to compensate for varying door clearances. Independent operation of each door.

No. 12390 "Latch-Track" Threshold—Extruded architectural bronze. Stumble-proof, ¼" thick stop extends the full width of opening . . . retards wind and water . . . serves as a door stop and latching point.

● For exits that are dependable, attractive and *safe*, always specify Von Duprin exit hardware. The Von Duprin line includes all types of devices and auxiliary items—everything you need for the complete exit installation on any type exit. Check the smart modern style—*all* the quality features in the double-door, vertical rod installation illustrated above.

WHEN YOU SPECIFY Von Duprin devices and accessories, you can be sure of the foremost quality and performance in every item. And you get the *complete* job, ready to go, at one time, in one shipment. Naturally, installation is easier and quicker . . . performance is better. For complete details, contact your Von Duprin "Exit Specialist." If you don't know his name, write:

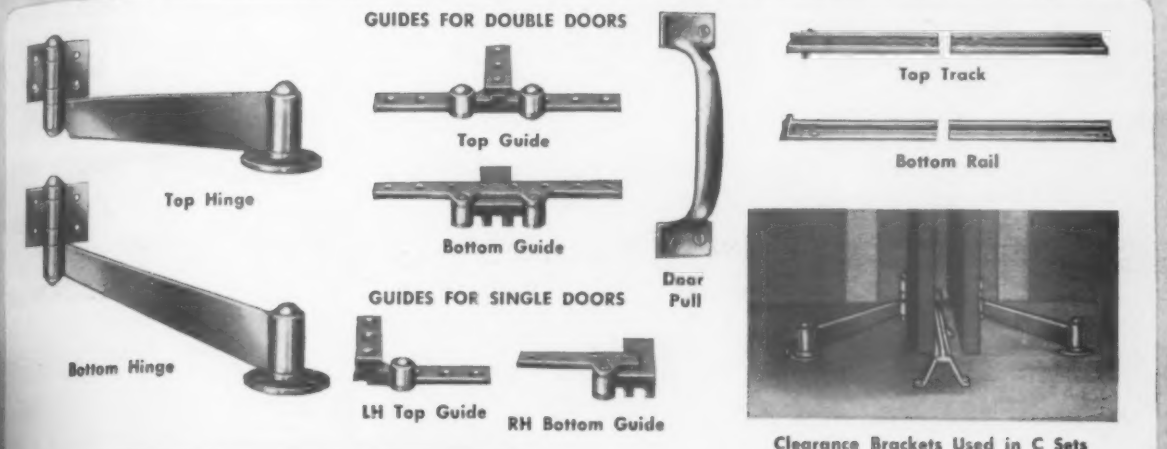
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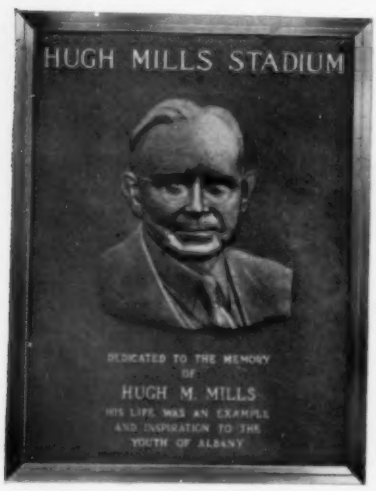
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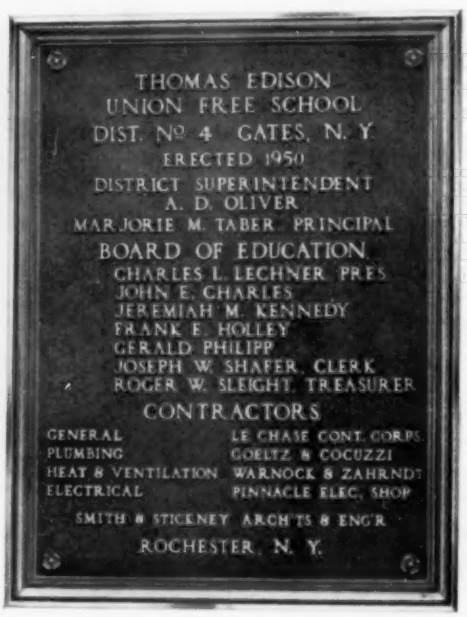


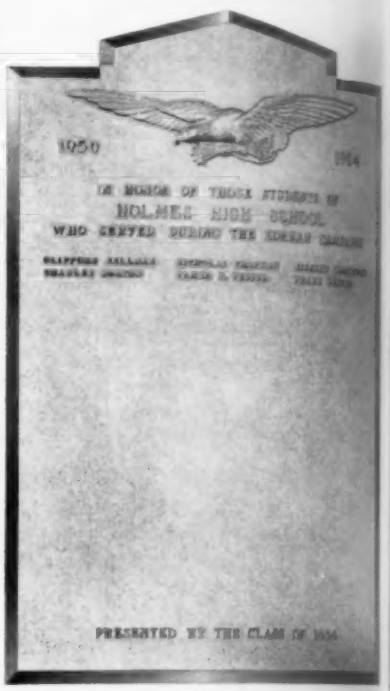
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Michaels Bronze and Aluminum Tablets and Signs are manufactured in a wide range of designs, shapes and sizes to meet all school and college requirements. A few are illustrated below. Many designs may be furnished from standard patterns or modeled to your specifications. Just tell us the size, the purpose of the tablet, and the wording to be used. We shall be glad to submit sketches and quote prices. When necessary, additional blueprints will be furnished. Write for illustrated folder.







Bronze and Aluminum Tablets are used to commemorate the construction of buildings; perpetuate the memory of public servants and benefactors who dedicate their lives to the service of mankind; honor those who served during the campaigns in which our country participated, and for many other purposes. Also available are name plates in any size, with or without titles. Michaels tablets are made of the finest materials obtainable. Lettering, borders and ornamentation are hand chased and burnished for contrast.



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Michaels Table Cases, Wall Cases, Aisle Cases, Suspended Cases, Recessed Cases, or Special Cases are manufactured with either extruded bronze or aluminum frames, and all have Michaels' exclusive innerlocking feature. Satin finish is standard, but if desired, electroplated or polished finishes may be supplied. Frames take full ¼" polished plate glass. Shelves of glass, ¼" or ½", depending on weight requirements, have all four edges polished. Shelf supports are adjustable every inch. Paracentric locks are standard in all locked cases. No screws are exposed on the face of frames except where necessary for removable or hinged panels. If illumination is necessary, it will be the latest and best type. Illustrated folder giving complete specifications will be sent on request.



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Model #75—$20.00 complete
Aluminum sign frame—8½" x 6½" high—with two interchangeable wood bakelite sign panels.



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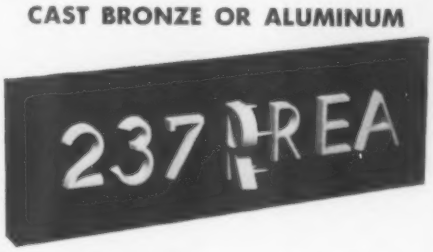
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Lifetime cast aluminum letters such as these shown above are dignified, attractive and legible. You can save money by purchasing letters made from our standard patterns.

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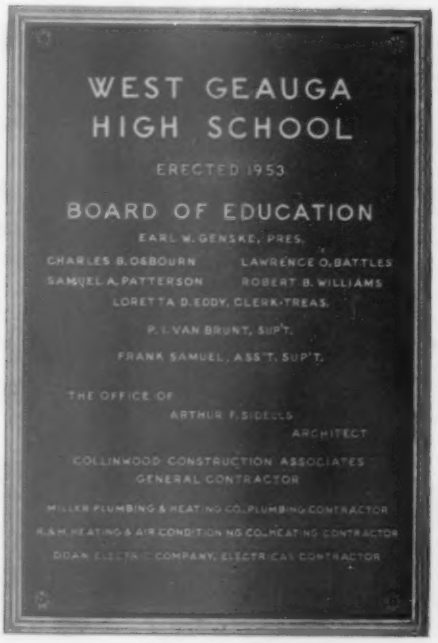
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AND Number Plates—either STOCK SIGNS or made to order from our standard dies. Polished ALUMILITED ALUMINUM lettering and borders make a pleasing contrast against black wrinkle finished backgrounds. Each plate is a solid piece of aluminum—will not tarnish, rust or corrode. Our low prices on these fine signs will amaze you.



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Bronze or Aluminum Dedication Tablets such as this should be a "MUST" for all new buildings. Besides serving as a historical record these tablets are a tangible tribute to the efforts of officials whose services made the building a reality.



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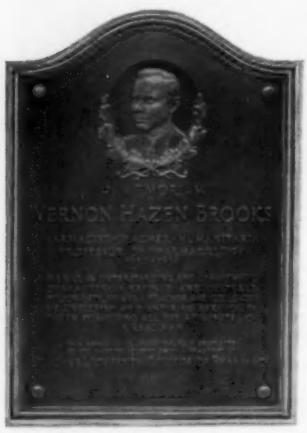
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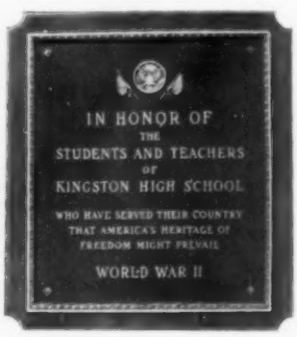
As one of America's largest manufacturers of bronze and aluminum plaques and tablets, United States Bronze Sign Company is particularly well equipped to give you expert, prompt and efficient service.
Over a quarter century of experience means you can depend on us for skilled workmanship and highest quality materials at truly reasonable prices. Our outstanding design facilities are always at your disposal. We will gladly submit preview sketches in color designed to your specific requirements without cost or obligation.



Bronze bas-relief tablet. Many sizes and designs available. Hand-sculptured clay model made from your photographs is submitted for approval before casting to assure likeness.



Bronze and aluminum identification plaques for exterior of building. Available in any size, large variety of artistic designs in rich, statuary finish or gleaming satin finish.



Honor rolls. Pay homage to those who served the nation, school, or community. General inscription, as above, or list of names with provision for adding names. Preview drawings in color help you visualize finished plaque.



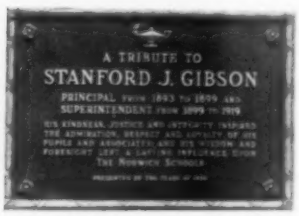
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School seals made to order. Many stock designs save you money; can be made any size.



Simple, dignified dedication plaque for auditorium, gymnasium or other gift or bequest. Permanent recognition encourages future donors. Standard raised letters and borders make for economy in any size.



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Individual letters for outside beautify school exterior. Made in bronze, aluminum, stainless steel, galvaneal, and porcelain enameled iron. Write for our new catalog.

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Herman Nelson Division, American Air Filter Co., Inc.	**C a/1**
John J. Nesbitt, Inc.	**C a/2**
Orr & Sembower, Inc.	**C a/3**
H. B. Smith Co., Inc.	**C a/4**
John J. Nesbitt, Inc.	**C a/5**
The Babcock & Wilcox Company	C 9
Bush Manufacturing Company	C 10
Combustioneer Div., The Steel Products Engineering Co.	C 11
Cyclotherm, Div. United States Radiator Corp.	C 12
Farrar & Trefts, Inc.	C 13
Fedders-Quigan Corporation	C 14
The Russell R. Gannon Co., Inc.	C 15
The International Boiler Works Co.	C 16
Jackson & Church Company	C 17
Johnson Service Company	C 18, 19
Petro	C 20, 21
Titusville Iron Works, Div. of Struthers-Wells Corp.	C 22, 23
The Trane Company	C 24, 25
The Nash Engineering Company	C 26
The Swartwout Company	C 27
The Will-Burt Company	C 28

b. Incinerators

Morse Boulger Destructor Co.	C 29

c. Plumbing

Bradley Washfountain Co.	**C c/1**
The Powers Regulator Co.	**C c/2**
Crane Co.	C 30, 31
Grinnell Company	C 32
The Halsey W. Taylor Co.	C 33
Century Brass Works, Inc.	C 34
Cordley & Hayes	C 35

d. Washroom Equipment

Electric-Aire Engineering Corp.	C 36
Lawler Automatic Controls, Inc.	C 37
Symmons Engineering Company	C 38

e. Lighting

Benjamin Electric Mfg. Co.	C 39-41
Curtis Lighting, Inc.	C 42, 43
General Electric Co., Apparatus Sales Div.	C 44
The Edwin F. Guth Company	C 45
General Lighting Company	C 46, 47
Holophane Company, Inc.	C 48, 49
Sunbeam Lighting Company	C 50
Sylvania Electric Products, Inc.	C 51
The Thompson Electric Company	C 52

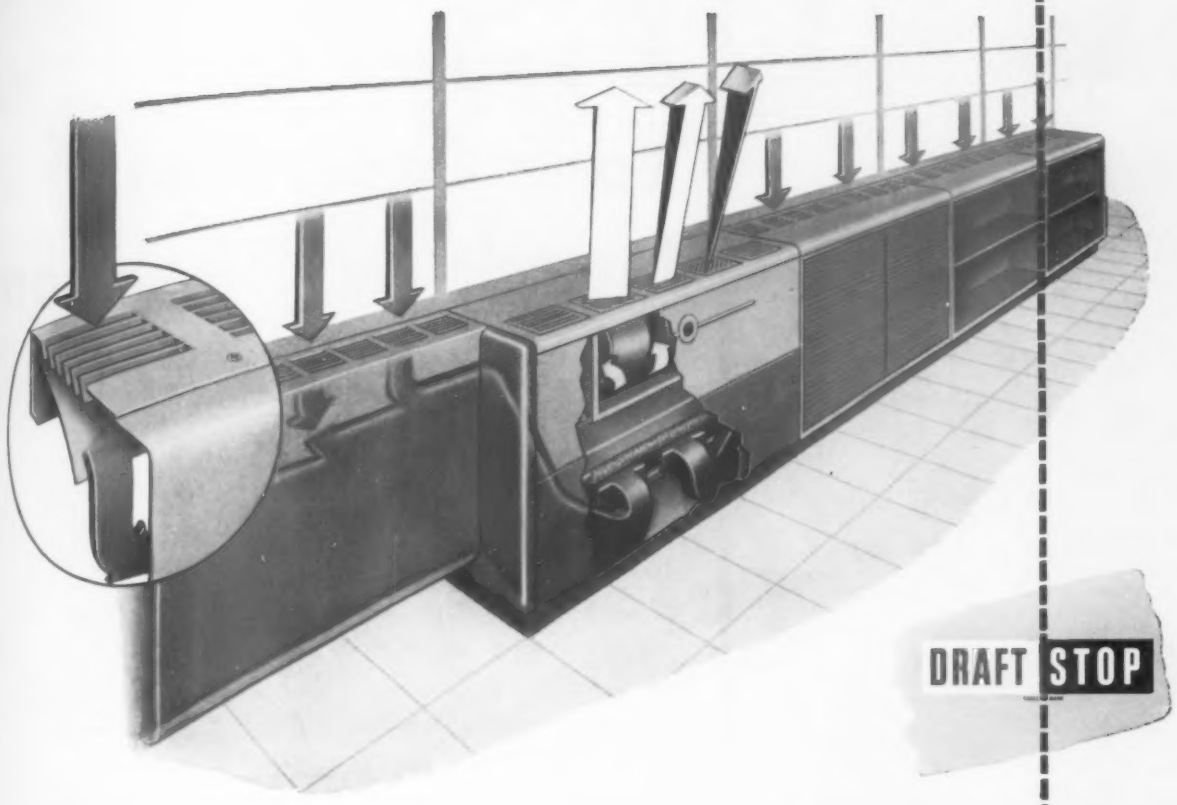
f. Electrical Equipment

The Electric Storage Battery Company	C 53
Graybar Electric Company, Inc.	C 54

g. Time Signaling Systems

International Business Machines Corporation	**C g/1**
The Standard Electric Time Company	**C g/2**
Simplex Time Recorder Co.	**C g/3**
Montgomery Manufacturing Co.	C 55

Why Do Schools Specify



THIS FEATURE BY FEATURE CHECK WILL GIVE YOU THE ANSWER

BEAUTY of design

Smooth, functional styling; a choice of pleasing finishes to match every interior color scheme; a complete line of matching utility cabinets—these DRAFT|STOP beauty features enable you to assemble an attractive unit ventilator system that complements any room design.

ADEQUATE air for cooling

DRAFT|STOP does more than just heat and ventilate. It compensates for the heat gain from students, lights and sun—provides controlled classroom cooling by introducing quantities of outdoor air in such a way as to avoid drafts. With DRAFT|STOP, you're assured sufficient cooling capacity to combat classroom overheating.

POSITIVE, practical draft elimination

DRAFT|STOP attacks the problem of down-drafts from cold window areas sensibly and economically. It intercepts and captures the cold air, drawing it back into the unit for reheating or expelling from the building. DRAFT|STOP is never found in that compromising position of having to heat and cool simultaneously—a condition certain to exist where heat is added to combat drafts in an already overheated classroom.

LOWER installation and heating costs

The DRAFT|STOP Unit Ventilator is designed for fast, economical installation on the job. The method of draft elimination employed makes for other logical and important economies. With DRAFT|STOP there is no costly supplementary radiation to buy or install. And, because DRAFT|STOP permits heating to individual room requirements, important fuel savings result with every day of operation.

DRAFT STOP *herman nelson*

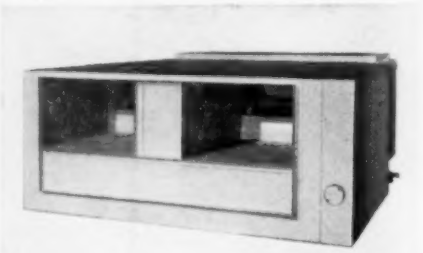
UNIT VENTILATOR / PRODUCTS

American Air Filter Company, Inc.

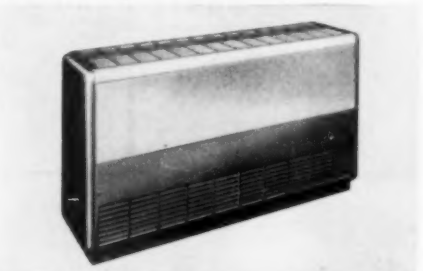
System of Classroom Heating, Ventilating and Cooling



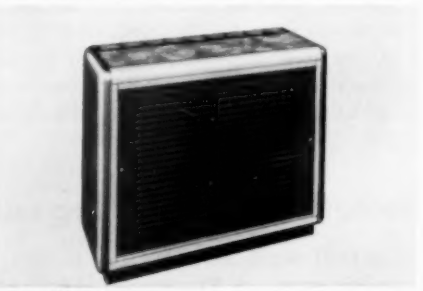
DRAFT|STOP UNIT VENTILATORS *are available in five models including, free standing, recessed, adapter back and window intake units . . . and with or without matching utility cabinets.*



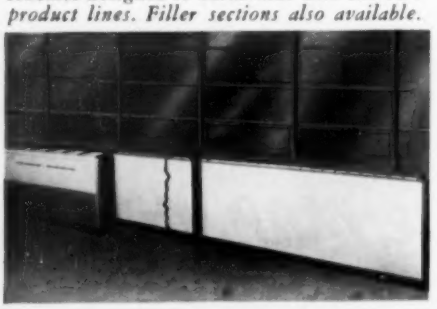
AUDITORIUM UNIT VENTILATORS *for use in rooms where a large volume of air needs to be heated and circulated, such as auditoriums and gymnasiums.*



DRAFT|STOP AND GENERAL PURPOSE CONVECTORS, *available in three sizes in each classification and designed to harmonize with the* DRAFT|STOP *or G.P. unit ventilator.*



DRAFT|STOP AND G.P. UTILITY CABINETS, *available in a variety of sizes and color schemes designed to harmonize with the two product lines. Filler sections also available.*



DRAFT|STOP WALL *is designed for use with* DRAFT|STOP *Ventilators where it is not desirable to use* DRAFT|STOP *Utility Cabinets or cavity wall construction.*

1 Source for Your Complete Needs in Classroom Cooling, Heating and Ventilation

After 36 years, the basic "Herman Nelson idea" remains the same—proper classroom heating and ventilating can best be accomplished by means of a unit ventilator in each room.

But only the idea has remained static. Continued research and product development is reflected in the modern DRAFT|STOP Unit Ventilator and correlated line of equipment. Your present and future needs for "classroom comfort" have been both anticipated and provided for in today's Herman Nelson Unit Ventilator Products.

Your point of contact with this complete heating and ventilating service is your local Herman Nelson representative. His experience, plus that of Herman Nelson engineers, can prove most helpful in determining your unit ventilation requirements.

For complete information, call your local Herman Nelson representative or write Herman Nelson Unit Ventilator Products, American Air Filter Company, Inc., Louisville 8, Kentucky.

AAF

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nesbitt



the
unit ventilator
system

that sets a new standard of classroom comfort

MANUFACTURED AND SOLD BY JOHN J. NESBITT, INC., PHILADELPHIA 36, PA.
SOLD ALSO BY AMERICAN BLOWER CORPORATION, DETROIT 32, MICH.

NESBITT SYNCRETIZER • WIND-O-LINE RADIATION • THE NESBITT PACKAGE

PROTECTING COMFORT AND HEALTH IN YOUR SCHOOLROOMS

AMERICAN SCHOOL AUTHORITIES recognize the profound effect of classroom thermal environment upon the comfort and health—and efficiency—of pupils.

The body is comfortable—the mind is alert—when the total heat exchange between body and surroundings is approximately in equilibrium. This state exists when the temperature of the surrounding air *and that of surrounding surfaces* are conducive to a normal rate of bodily metabolism.

To accomplish this standard of classroom comfort a heating and ventilating system must be capable of meeting these requirements:

Individual control for varying demands in occupied or unoccupied rooms, and quick, economical heating for early morning and other occasions.

The ability to *remove* as well as to *supply* heat, because cooling is needed more frequently than heating, even when the outside temperature is comparatively low.

It is a common practice—though a single standard does not apply—to require a minimum of 10 to 15 cubic feet of outdoor air per minute per pupil for ventilation and up to 30 cubic feet for heat and odor removal. The mixture of outdoor air with room air must be automatically controlled according to demand, but with the minimum temperature never lower than 55° to 60°, to prevent drafts.

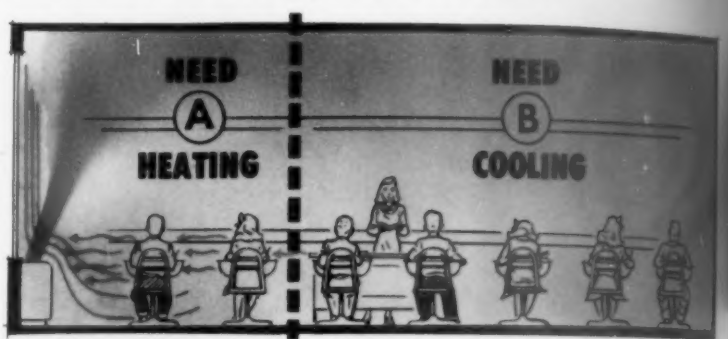
Protection against cold surfaces. Room air temperature alone is not a reliable index of classroom comfort. In frigid weather, large window areas and exposed walls become cold as ice, robbing some pupils of body heat. The system must provide protective heat along low temperature surfaces for as long as needed—even while the unit is delivering cooled air for ventilation and heat removal.

The Nesbitt Syncretizer with Wind-o-line Radiation meets all these requirements for thermal comfort.

Classroom Thermal Comfort is Really TWO Problems

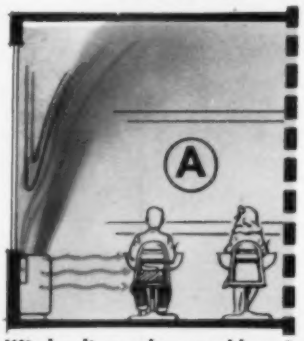
In fully occupied classrooms, for much of the time, the air stream discharged by the unit ventilator must be *cooler* than the desired room temperature to prevent overheating. At the very *same time* in frigid weather, the large window surface is like a "wall of ice"—robbing radiant heat from pupils' bodies and creating chilling downdraft.

Manifestly, the unit ventilator alone cannot provide *cooled air* for ventilation and *heated air* for cold surface protection at the same time. The two distinct needs require separate handling.

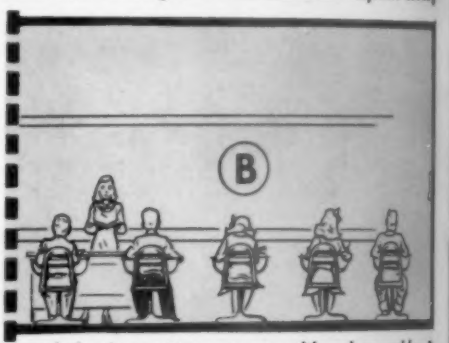


On cold days large windows demand heat long after the classroom requires cooling

The complete Nesbitt system—Syncretizer with Wind-o-line — solves both problems, separately, but under unified control. Wind-o-line's convected and radiated heat remains on for so long as the threat of cold surface downdraft exists — and without inhibiting the Syncretizer. Wind-o-line is more than the answer to window downdraft; it ends excessive radiation of body heat and is a step toward the easier solution of problem B.



Wind-o-line solves problem A



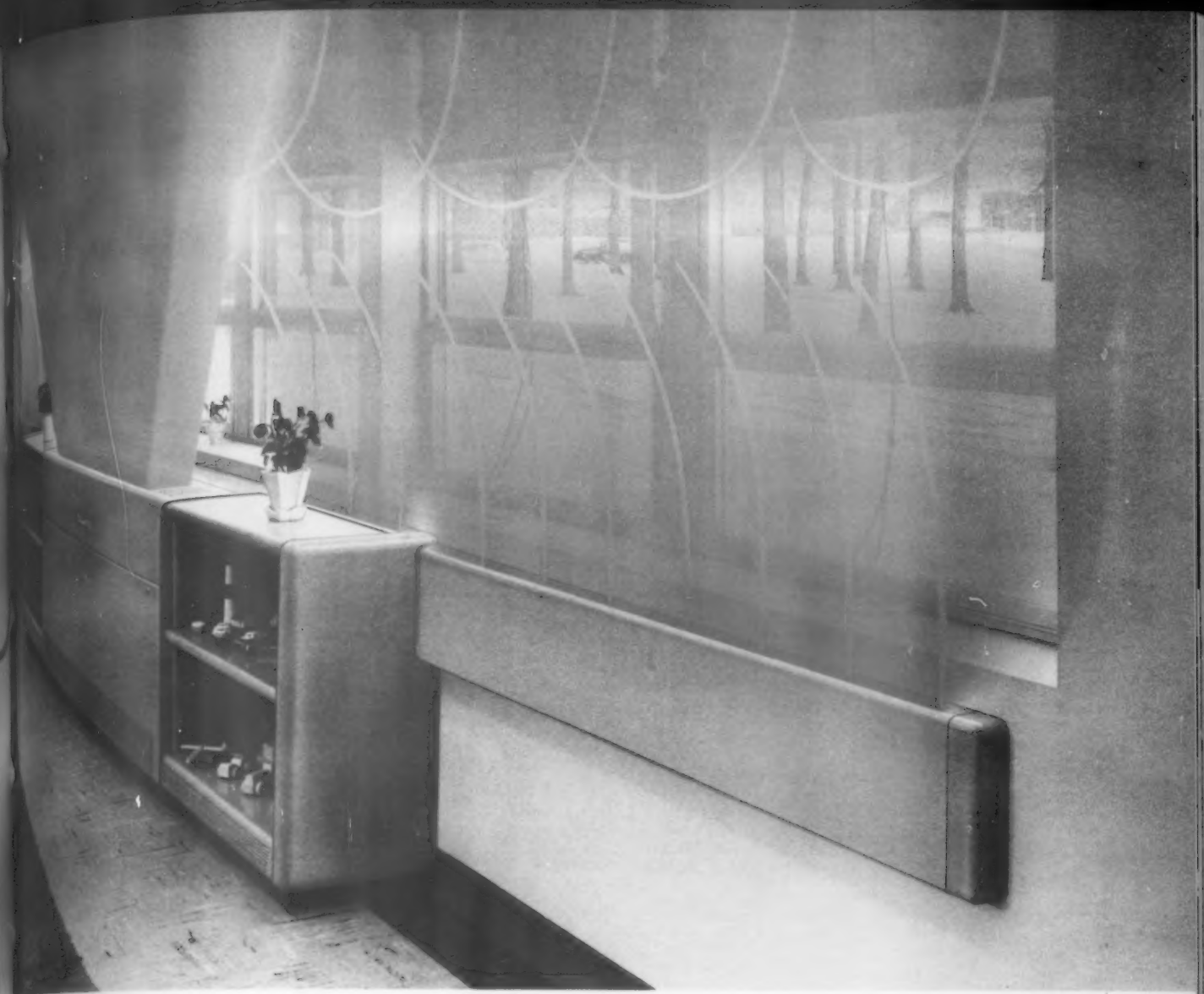
—and the Syncretizer more readily solves problem B

With cold surface protection assured by the Wind-o-line, the Syncretizer ventilating unit can function with a generally lower room thermostat setting, adding or removing heat as determined by the room requirements. The cooling power of the Syncretizer is never restricted. Wind-o-line shuts off whenever more than the designed minimum quantity of outdoor air is needed for cooling.

The result is a symmetrical thermal environment — ideal working conditions for teacher and pupils — achieved at the lowest operating cost.



Simultaneously: cold surface protection and classroom cooling, for perfect comfort

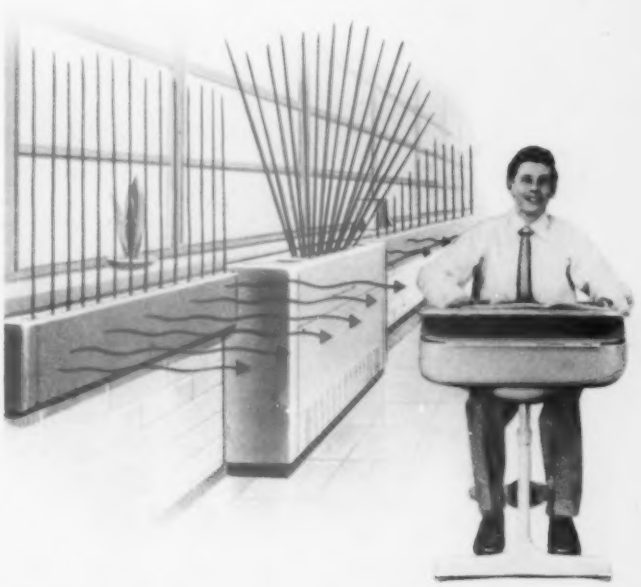


Illustrating a Nesbitt Syncretizer with Wind-o-line Radiation integrated partly in storage cabinets and partly in wall-hung casings. Note how heated air from the Wind-o-line diverts the cold window downdraft even while the Syncretizer discharges a cooling air stream.

Wind-o-line .. first line of defense

Actual classroom tests prove that Wind-o-line Radiation remains ON—because it is needed—for long periods while Syncretizer is cooling.

In many classrooms Wind-o-line Radiation will remain ON continuously for the 6½ school hours in sub-freezing weather, regardless of sun exposure. During mild weather — up to 50° — Wind-o-line will remain ON for a major part of the school day. Even in mild weather above 50° Wind-o-line will function for early warm up and occasionally during the day when heating is required. Wind-o-line remains ON as long as needed for cold surface protection and shuts off immediately when more than the designed minimum quantity of outdoor air is required for cooling.



floor temperatures 2° to 4° higher

An important consequence of Wind-o-line's upward diversion of the cold window downdraft — coupled with the Syncretizer's floor-line recirculation — is that floor temperatures are *raised from two to four degrees* — a marked contribution to overall comfort.

THE NESBITT SYNCRETIZER

cycles of control

To meet varying ventilation requirements, the Syncretizer may operate under four distinct ventilation control cycles: Type F, A, O, and W. These cycles provide different sequences of radiator and damper operation for mixing outdoor and room air. Change of control sequence can be made without altering the basic unit.

In all four cycles, the damper is closed to outdoor air until room temperature is just below the thermostatic setting. It then introduces outdoor air in quantities according to the cycle.

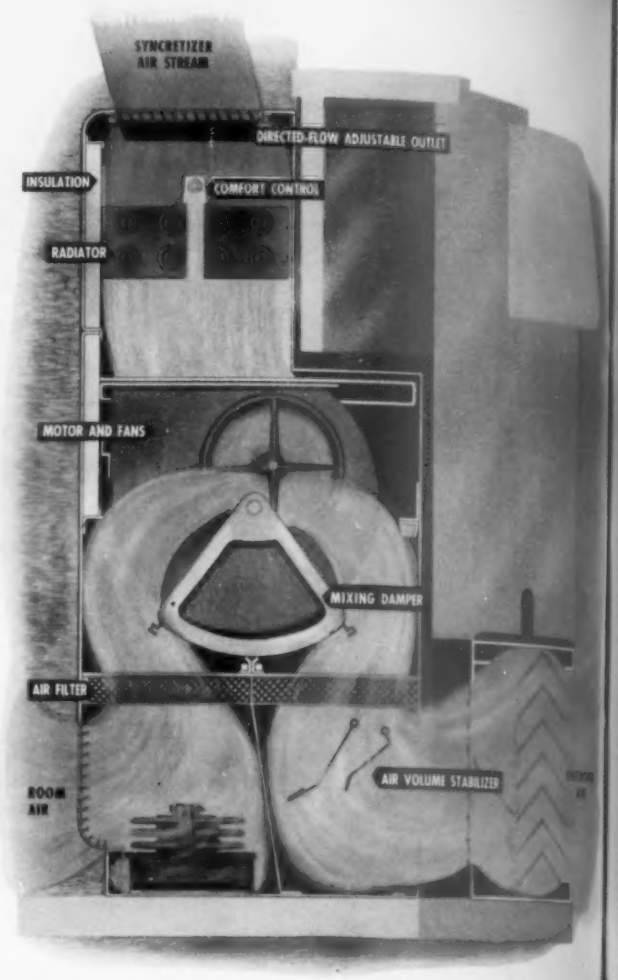
As room temperature approaches the control setting, the room thermostat gradually closes the radiator valve. Should room temperature rise above the control setting, the valve will close completely and cool air will be introduced into the room under air stream thermostat control.

TYPE F—ALL OUTDOOR AIR—As room temperature approaches the control setting, the damper opens to admit all outdoor air. If cooling is required, the air stream thermostat maintains the minimum discharge temperature by partially opening the valve.

TYPE A—VARIABLE QUANTITY OF OUTDOOR AIR WITH A FIXED MINIMUM—As room temperature appoaches the control setting, the damper opens to admit a predetermined minimum quantity of outdoor air. After the room is up to temperature and the valve closed, if more cooling air is required, the damper admits additional outdoor air. The air stream thermostat maintains the minimum discharge temperature by first returning the damper to the minimum position, and then by opening the valve if necessary.

TYPE O—VARIABLE QUANTITY OF OUTSIDE AIR WITHOUT A FIXED MINIMUM—As the room approaches thermostatic temperature, the damper opens to admit a quantity of outside air determined by the outdoor temperature and the air stream thermostat setting. The air stream thermostat regulates the damper position to maintain a constant temperature mixture of outdoor and recirculated air. If cooling is required, the control valve closes and air is delivered into the room at the mixed-air temperature.

TYPE W—COMBINATION CYCLE—As the room approaches the control setting, the damper opens to admit a predetermined minimum quantity of outdoor air. After the room is up to temperature, the valve closes. If more outdoor air is required for cooling, the damper admits the necessary additional quantity. The air stream thermostat maintains the minimum discharge temperature by positioning the damper to obtain the desired mixture temperature.



exclusive features

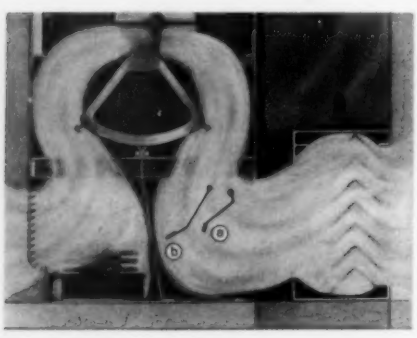
air volume stabilizer

Two self-operating pivoted vanes gradually restrict the outdoor air opening as wind velocities increase. This ingenious device prevents outdoor air in excess of the designed percentage from entering the unit. It not only eliminates cold drafts and "blow through" without affecting room-air recirculation, but because it requires the heating of only the specified quantity of outdoor air, it achieves an operating economy not attained by any other unit ventilator.

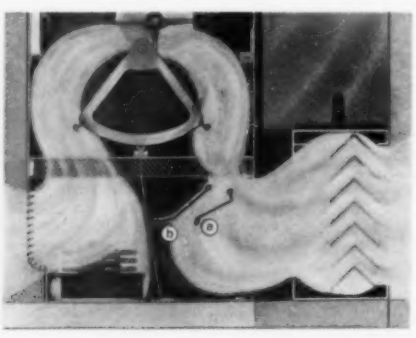
NO WIND—Vanes A and B lean slightly, sensitive only to the normal outdoor air volume entering the unit.

MEDIUM WIND—As the wind velocity increases and a greater volume of outdoor air attempts to enter, the vanes swing inward by the very force of the wind to restrict the inlet opening.

STRONG WIND—When the wind reaches higher velocities, the vanes swing fully to close all but about 25% of the original area. Now the outdoor air must flow through the small opening C, which is insufficient for blow-through but adequate for designed ventilation requirements. As the wind diminishes, vanes return to earlier positions, illustrated below.



NO WIND



MEDIUM WIND



STRONG WIND

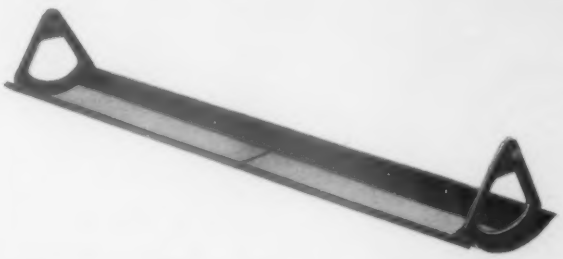
motor and fan assembly



The Nesbitt motor and fan assembly is the simplest known means of powering fans. Located *below* the radiator, the fans cannot be damaged by foreign objects dropped through the discharge grille, and the motor is cooled by a constant stream of unheated air. The air stream is heated after it leaves the fans, expanding to give 10% more volume. This results in less work for the fans, quieter operation and lower current consumption.

The Syncretizer motor is a totally-enclosed, resilient-mounted, multi-speed, condenser type containing no brushes, internal contactors or switches. From the motor ends extend extra strong solid steel shafts upon which multi-blade aluminum fans are mounted. Motor and fan speeds are below 700 RPM for extreme quietness. The motor bearings are the only bearings in the entire assembly. This exclusive Nesbitt floating fan principle has been successfully and continuously used in all Nesbitt unit ventilators since 1917. Its use eliminates all couplings, belts, drives, outboard bearings and alignment problems. No other unit ventilator has as few moving parts. All Nesbitt Syncretizers are listed and approved by Underwriters' Laboratories, Inc.

one piece roll damper



The one-piece roll damper has been standard equipment in Nesbitt Syncretizers since 1922. It is a marvel of simplicity in construction and performance, rotating on but two bronze bearings. Its operation is easily adaptable to meet changes in state ventilation requirements. This wide adaptability to changing requirements is your guarantee that time will not outmode the Nesbitt Syncretizer. When automatically controlled, the Nesbitt damper mixes indoor and outdoor air to help achieve maximum fuel economies characteristic of Syncretizer operation.

comfort control



After the room thermostat has been satisfied, control of the air stream passes over to the Nesbitt Comfort Control—a simple device made integral with the radiator in the F and A cycles.

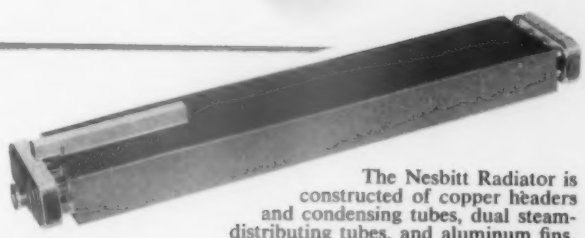
A portion of the air stream thermostat is exposed to heated air, the remaining part to unheated air from the fans through a heated channel in the radiator. To maintain an average instrument temperature, the heated portion requires a higher temperature as the unheated portion lowers. Outside temperatures thus have a direct voice in controlling the minimum temperature of the air stream—making it warmer as outside temperature goes down . . . cooler as outside temperature rises.

This automatic provision of a "thermal blanket" in colder weather produces a perfect harmony of air stream and room temperatures for maximum comfort. It does not, however, affect the capacity of the unit to provide maximum cooling in milder weather when it is needed to prevent overheating.

MINIMUM AIR DISCHARGE TEMPERATURE
FOR VARIOUS OUTDOOR TEMPERATURES

Outdoor Air Temperature	0°	15°	20°	30°	40°	50°
Min. Air Discharge Temperature	80°	74°	72°	68°	64°	60°

uniform air discharge



Uniform air discharge temperatures are the result of good steam distribution. The Nesbitt radiator with dual steam-distributing tubes—an exclusive Nesbitt development—assures uniform temperatures over the full discharge area. Uniform distribution (smoke demonstration below) and radiator location combine to make the Nesbitt Radiator thoroughly freezeproof.

The Nesbitt Radiator is constructed of copper headers and condensing tubes, dual steam-distributing tubes, and aluminum fins. All connections are silver-brazed.

directed flow outlet



A series of adjustable vanes positioned beneath the discharge grille permits the direction of the air stream to be varied over a wide range from extreme left to extreme right. This feature makes possible the selection of a discharge pattern best suited to any particular classroom condition, and is adjustable on the job to obtain maximum effectiveness.

THE NESBITT SYNCRETIZER WITH WIND·O·LINE RADIATION

a completely integrated system

HEATING *where and when needed* **TO PREVENT COLD DRAFTS**

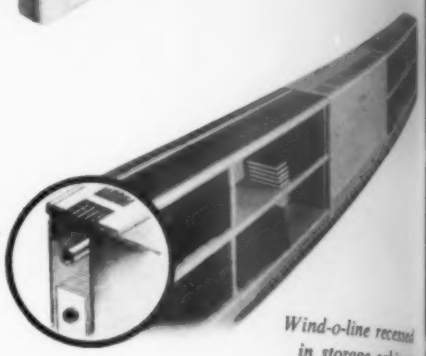
COOLING *where and when needed* **TO PREVENT OVERHEATING**

Wind-o-line Radiation — whether in wall-hung casing or recessed in storage cabinets — is fully integrated with the Syncretizer. Its piping connections and controls are all within the unit ventilator casing. Indeed, Wind-o-line may be considered as an extension of the radiation of the Syncretizer. Thus unified in arrangement and control, the two perform their respective tasks in perfect harmony — the Wind-o-line protecting against cold surfaces, the Syncretizer maintaining the desired classroom air condition — together achieving a new standard of comfort and economy.

Wind-o-line Radiation may be applied to steam systems which return condensate to the boiler through a dry return using a pump and receiver, boiler return trap, or vacuum pump. It may also be applied to forced hot water heating systems.



Wind-o-line in wall-hung casing

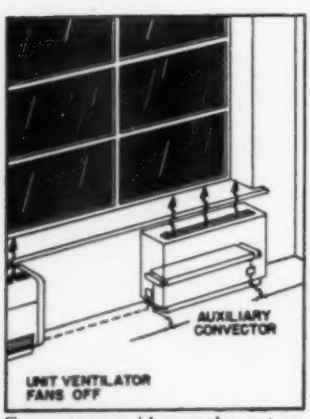


Wind-o-line recessed in storage cabinets

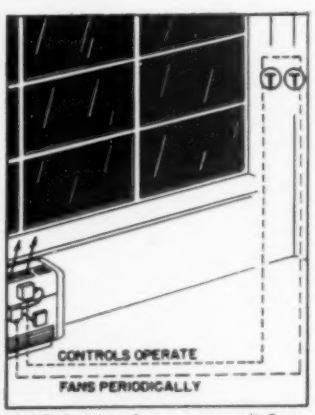
Wind-o-line copper-tube, aluminum-fin radiation may be installed two ways: RECESSED in Nesbitt storage cabinets (styles, heights and lengths as listed on page 7) channeled for floor-level air intake and provided with top louvred discharge grille; or, WALL-HUNG in an attractive removable-front casing of 16-gauge steel; 2⅜″ deep; 10″ high; four standard lengths, 3′6″, 4′, 5′, and 6′; finished to match Syncretizer.

Both types available in 450, 550, 700 Btu per lineal foot at basic rating, 2 lb. steam, 70 deg. entering air

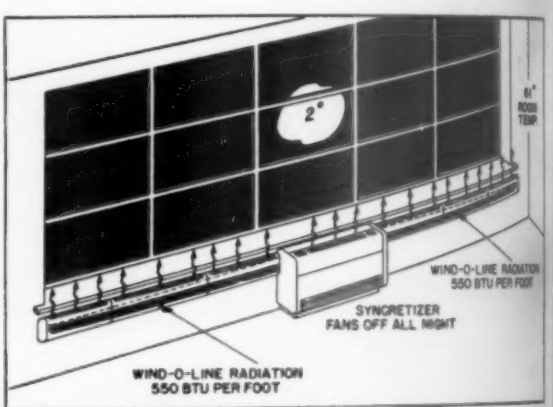
maintenance of overnight temperatures



Convector provides supplementary heat, but is not used during day.



Added controls operate unit fans periodically through the night.



Gravity heat of Syncretizer and Wind-o-line maintains satisfactory overnight temperatures—without additional equipment or controls.

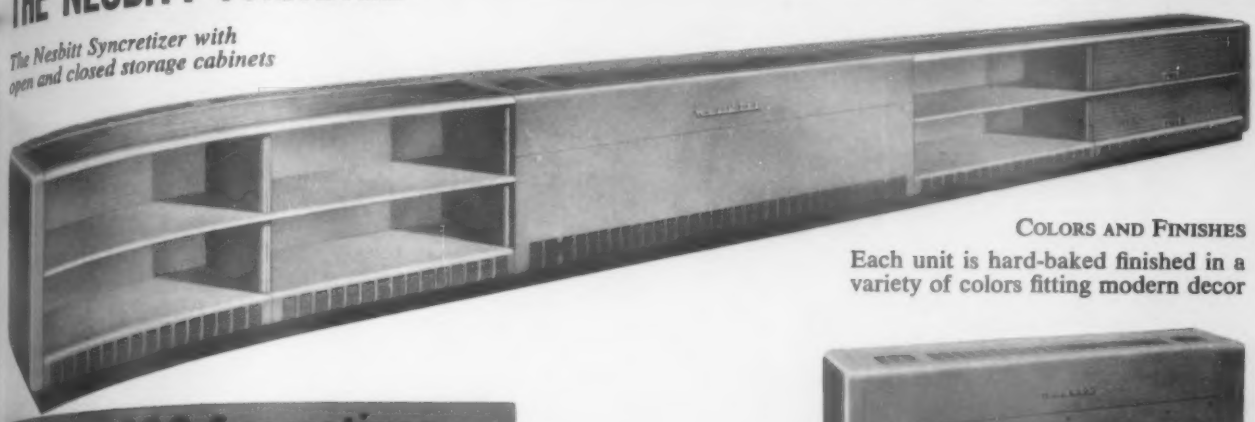
It is generally agreed that classroom temperatures should be maintained at about 55° overnight and during periods of shutdown in cold weather. This permits quick recovery to comfort conditions and more stable control during the first hours of the next school day. (Cutting off the heat altogether, and letting the classroom temperature drop to 40° or 45°, makes the recovery difficult — particularly in restoring heat to the floor slab, walls, desks, etc. — and leads to morning room-temperature fluctuations, possible overheating, and abnormal radiant heat losses by pupils to surrounding objects.)

Users of unit ventilators without Wind-o-line Radiation to maintain an optimum overnight temperature — must resort to a) operating the units as heaters (recirculating only) under thermostat control; or b) installing supplementary gravity heating with additional piping and controls.

Extensive field tests have proved that when Wind-o-line Radiation is integrated with Nesbitt Syncretizers, the gravity heating capacity is ample to maintain overnight classroom temperatures of 55° in zero weather — hence eliminating the cost of separate provision for maintaining overnight temperatures.

THE NESBITT PACKAGE

The Nesbitt Syncretizer with open and closed storage cabinets



COLORS AND FINISHES

Each unit is hard-baked finished in a variety of colors fitting modern decor



Series 500 Syncretizer

The Syncretizer is designed for steam or forced hot water systems and is made in four basic sizes, with respect to air-handling capacity, and in 32″ and 28″ cabinet heights. Each size can be had in a variety of vertical and horizontal models. The following table relates to Type NR non-recessed Syncretizer.

MODEL NO.	ANEMOMETER A RATING	LENGTH	HEIGHT	DEPTH	INTAKE WALL BOX
554	750 CFM	59″	32″ or 28″	14½″	32″ x 10⅜″
564	1000 CFM	69″	32″ or 28″	14½″	41″ x 10⅜″
572	1260 CFM	77″	32″ or 28″	14½″	50″ x 10⅜″
580	1560 CFM	85″	32″ or 28″	14½″	57″ x 10⅜″



open storage cabinets

Open storage units, designed and constructed by Nesbitt, are made of 16 gauge furniture steel, welded into an integral assembly. Shelving surfaces are smooth, edges are rounded. All edges are formed for added strength. Each unit is designed with a recessed kickplate.

closed storage cabinets

Nesbitt-designed and manufactured closed storage units are constructed of 16 gauge furniture steel, all-welded. Free-operating, receding doors give access to all parts of the cabinet when open. Doors are lined with ½″ sound-deadening material. Each door may be provided with an individual lock and key.



MODEL NO.		LENGTH	HEIGHT*	DEPTH
24-OS	24-CS	24″	31¾″ or 27¾″	14½″
36-OS	36-CS	36″	31¾″ or 27¾″	14½″
48-OS	48-CS	48″	31¾″ or 27¾″	14½″

*Height without linoleum is ⅛″ less

auxiliary convector

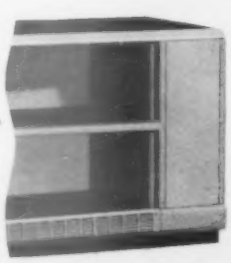
Augments heat supplied by the Syncretizer when a greater volume is required. Non-ferrous heating element, bottom feed and return connections. Cabinet is made of 14 gauge furniture steel, welded throughout. Removable front. Available in three sizes in both 28″ and 32″ cabinet heights as indicated in table below. Capacities at 2 lbs. steam, 65 entering air:



32″ MODEL	EDR	28″ MODEL	EDR	LENGTH	DEPTH
80C5	80	2842C	71	47″	14½″
110C5	110	2854C	98	59″	14½″
140C5	140	2872C	125	77″	14½″

adjustable fill-in sections

Some designers prefer to terminate the Nesbitt Package before the wall is reached, in which case the removable end cover of the Syncretizer is used to complete the end storage unit. Where it is desired to fill the entire space from wall to wall, adjustable fill-in sections are provided to complete the ensemble.



The Enlarging Circle of

NESBITT

Heating and Ventilating Products



more than 100,000

Nesbitt unit ventilators are rendering satisfactory service in every State of the Union and in the Dominion of Canada

Be you architect, engineer, contractor, owner or user, your heating and ventilating needs may be summed up as two: the comfort that comes of good performance; and the safety that lies in choosing dependable equipment. Is it not so? These needs are met within the Nesbitt circle of fine heating and ventilating products. The very first Nesbitt unit ventilators . . . installed in 1917 . . . are still in operation and giving satisfactory service. Since then more than 100,000 successful installations have earned for Nesbitt the hearty approval of school officials, architects and engineers.

Nesbitt sales and service are nation-wide through offices of John J. Nesbitt, Inc., and American Blower Corporation . . and in Canada through Canadian Sirocco Company, Ltd.

sales and service

The Nesbitt Syncretizer, Wind-o-line Radiation, The Nesbitt Package, Nesbitt Thermovent, Nesbitt Sill-line Radiation with Storage Units, and Nesbitt Deluxe Cabinet Heaters are sold through offices of American Blower Corporation (ABC) and John J. Nesbitt, Inc. (JJN) as follows:

City and State	*Street Address*	*Telephone*
ALBANY 7, N. Y. (JJN)	93 State St., Room 43	Albany 6-7661
ALBUQUERQUE, N. M. (ABC)	112 W. Granite Ave.	3-5503
ATLANTA 3, GA. (ABC)	101 Marietta St.	Walnut 5617
BALTIMORE 18, MD. (JJN)	33 E. 21st St.	Belmont 5-5895
BIRMINGHAM 3, ALA. (ABC)	1638 Brown Marx Bldg.	7-2383
BOSTON 15, MASS. (JJN)	236 Huntington Ave.	Copley 7-4202
BUFFALO 16, N. Y. (JJN)	1441 Hertel Ave.	Delaware 3739
CHARLESTON, W. VA. (ABC)	1029 Virginia St.	6-1331
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CLEVELAND 15, OHIO (ABC)	1010 Euclid Ave.	Main 1-6846
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WASHINGTON, D. C. (ABC)	Washington Bldg. 15th & N. Y. Ave., N. W.	National 8-2872

In Canada these products are sold through the Canadian Sirocco Company, Ltd., P.O. Box 360, 310 Ellis Street, Windsor, Ontario.

For further information, sales assistance, or engineering data, contact the nearest office of John J. Nesbitt, Inc. or American Blower Corporation, or write direct.

O&S

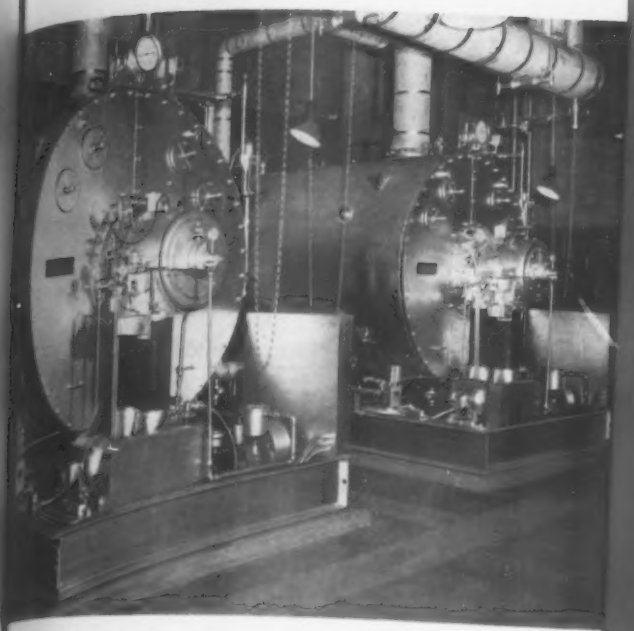
C a/3

Powermaster®

PACKAGED AUTOMATIC BOILERS FOR SCHOOLS

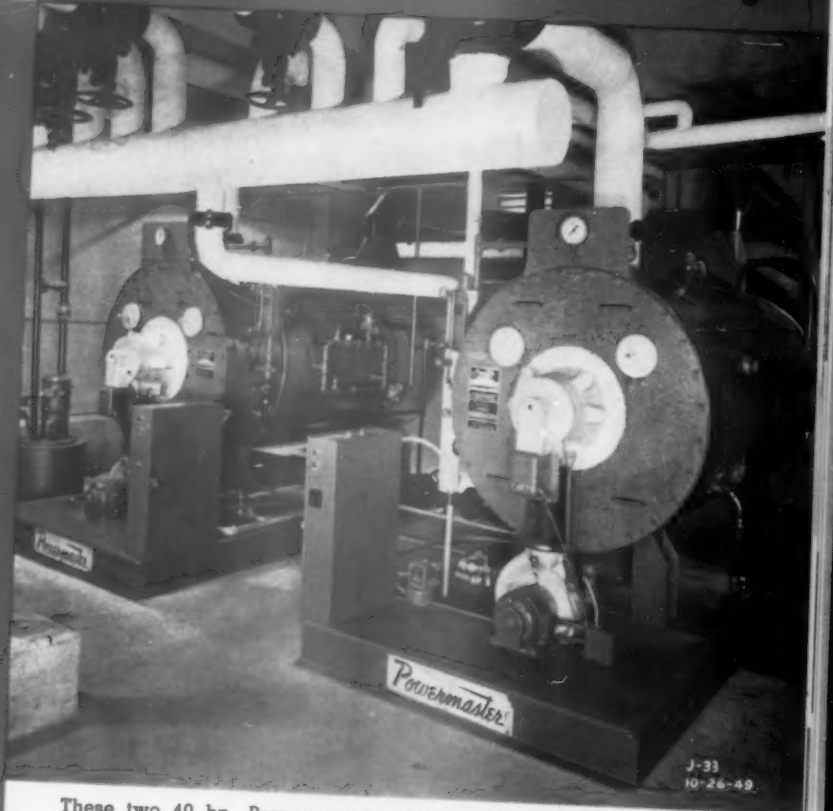
Sizes to 500 HP
Pressures to 250 Psi

Gas, Oil or Combination Gas and Oil Firing



two 250 hp. 15 psi. *Powermasters* (Model 3) supply steam and ...ter at Nether-Providence High School at Wallingford, Pa. They are ... with intermediate grades of oil and are operated at 5 psi. Archi... Irwell Lewis Shay, Philadelphia; Consulting Engineer: E. A. ...enlen, Jr.; Contractor: John Borden & Bro.

- Completely Factory Assembled
- Cost-Saving Installation
- Space-Saving Compactness
- Fuel-Saving Efficiency
- Fast Steaming
- Instant Response to Load Swings
- Hospital-Clean Operation
- Maintenance-Saving Accessibility
- Fully Automatic Operating and Safety Controls
- Factory Fire-Tested



These two 40 hp. *Powermasters* (Model 4) supply 15 psi. steam for heating service at the Fleetwood (Pa.) Public School. Completely automatic operation, including on-off firing, reduces supervision of the units by the janitor to the minimum. They are equipped with a pressure atomizing burner for firing light oil only. Heating Contractor: Beidler Engineering, Reading, Pa.

ORR & SEMBOWER, INC. • READING, PENNSYLVANIA

Building Dependable Boilers Since 1885

Powermaster boilers are modern, compact, self-contained, completely automatic units with an outstanding record for highly dependable and efficient performance. Two models are available in standard sizes ranging from 15 hp. to 500 hp. for steam generation to 250 psi. and for hot water to 30 psi. Both of the models are designed for *interchangeability of fuels* . . . various fuel oils—natural or manufactured gas—or combination gas and oil. This cost-saving advantage is available in such a wide range of capacities only with *Powermaster* Packaged Automatic Boilers. *Powermasters* are designed and built to ASME Boiler Code requirements, approved by Underwriters' Laboratories, Inc., and fully guaranteed by Orr & Sembower, Inc. All units are thoroughly factory fire-tested and supplied with a complete test report. As delivered, *Powermasters* are fully equipped and completely wired for quick installation and operation.

All over America—in U. S. Possessions . . . in Canada . . . South America . . . Europe . . . Asia . . . Africa—thousands of *Powermaster* Packaged Automatic Boilers are now supplying steam and hot water—with outstanding reliability and economy for industrial plants, dairies, hospitals, laundries, schools, institutions, public buildings and other requirements.

Your *Powermaster* representative will help you with recommendations and suggestions for selecting the most economical units to supply steam or hot water requirements in any kind of service.

A choice of 2 *Powermaster*® MODELS



Model 3 *Powermaster*

Experienced-proved to be the standard of industry.

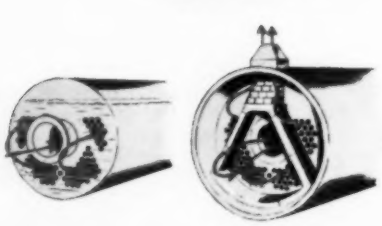
- Complete Fuel Flexibility:

  Light or Heavy Oil, Any Gas or Combination Oil and Gas.

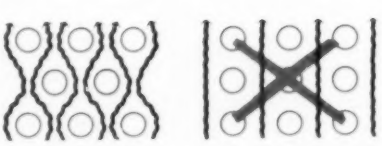
- Choice of:

  Air Atomizing VORIFLOW Oil Burner—Pre-Mix VORIFLOW Gas Burner—Combination VORIFLOW Oil and Gas Burner—All Designed and Built by O & S.

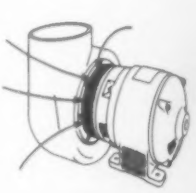
- Full-Range Modulation with VORIFLOW Combustion.
- All Middle-Range and Large Capacities.
- Selection of Automatic Operating and Safety Controls.
- Instant Change from Fuel to Fuel.



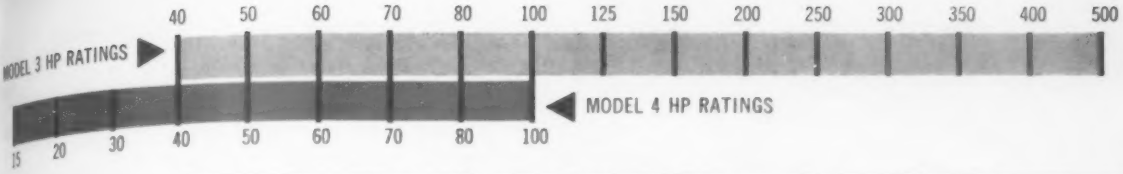
3-Pass Boiler with successive parallel paths and single gas flow reversal at each end assures most efficient flue gas velocity and heat transfer, provides maximum maintenance convenience, and requires no complex front end baffling.



Staggered Tubes —Freedom from ineffectual boiler water eddies assures quicker heating, faster steaming, and high quality dry steam. Scrubbing action of rising water prevents corrosive gas deposits on tube surfaces.



Forced Draft provides most accurate control of combustion air supply; permits use of smaller, low-cost stack, fan and motor; requires less fan maintenance because no hot products of combustion pass through the fan.



Powermaster RATINGS DIMENSIONS and WEIGHTS

BOILER H. P.	OUTPUT			OVERALL DIMENSIONS				WEIGHT Lb.	Fuel Consump. (100% of rating)		
	Lbs. Steam/ Hr. at 212F.	EDR (Water) Sq. Ft.	EDR (Steam) Sq. Ft.	Length	Width Oil	Width Gas	Height		#2 Oil Gal./Hr.	#6 Oil Gal./Hr.	Gas Cu. Ft./Hr.
15	517	3,336	2,085	7′ 0″	3′ 7″	4′ 0″	5′ 4″	2,700	4.7	—	628
20	690	4,448	2,780	7′ 11″	3′ 7″	4′ 0″	5′ 4″	3,000	6.2	—	837
30	1,035	6,672	4,170	8′ 9″	4′ 1″	4′ 6″	6′ 2″	3,750	9.4	—	1,255
40	1,380	8,896	5,560	10′ 3″	4′ 9″	5′ 3″	6′ 9″	6,350	12.5	10.8	1,673
50	1,725	11,120	6,950	11′ 8″	4′ 9″	5′ 3″	6′ 9″	6,750	15.6	13.5	2,091
60	2,070	13,344	8,340	10′ 6″	5′ 9″	6′ 3″	7′ 4″	7,900	18.7	16.1	2,510
70	2,415	15,568	9,730	11′ 6″	5′ 9″	6′ 3″	7′ 4″	8,500	21.9	18.8	2,928
80	2,760	17,792	11,120	11′ 9″	6′ 2″	6′ 10″	8′ 1″	10,700	25.0	21.5	3,346
100	3,450	22,240	13,900	11′ 3″	6′ 7″	7′ 3″	8′ 8″	12,500	31.2	26.9	4,183
125	4,312	27,800	17,375	13′ 1″	6′ 7″	7′ 3″	8′ 8″	14,000	39.1	33.6	5,229
150	5,175	33,360	20,850	14′ 7″	7′ 11″	8′ 9″	9′ 5″	17,350	46.9	40.4	6,274
200	6,900	44,480	27,800	16′ 7″	7′ 11″	8′ 9″	9′ 6″	22,100	62.5	53.8	8,366
250	8,625	55,600	34,750	15′ 7″	8′ 1″	8′ 11″	9′ 11″	25,560	78.1	67.3	10,457
300	10,350	66,720	41,700	17′ 5″	8′ 1″	8′ 10″	9′ 11″	33,700	93.8	80.7	12,548
350	12,075	77,840	48,650	17′ 9″	9′ 0″	9′ 10″	10′ 11″	36,000	109.4	94.2	14,639
400	13,800	88,960	55,600	18′ 11″	9′ 1″	9′ 10″	10′ 11″	37,000	125.0	107.7	16,731
500	17,250	111,200	69,500	19′ 7″	9′ 1″	10′ 0″	11′ 8″	45,000	156.3	134.6	20,914

to meet your specific operating requirements to your best advantage.

Model 4 *Powermaster*

Simplicity of operation and controls is an important advantage.

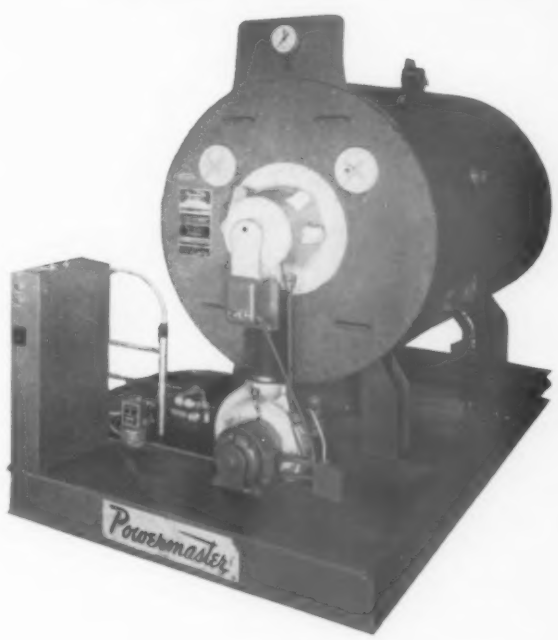
- Choice of Fuels:

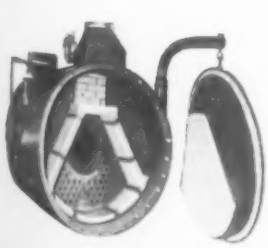
  Light Distillate—Natural Gas—Manufactured Gas—Combination Oil and Gas.

- Choice of:

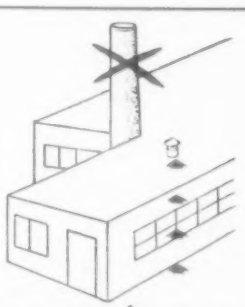
  Mechanical Pressure Atomizing Oil Burner—Pre-Mix Gas Burner—Combination Oil and Gas Burner—All Designed and Built by O & S.

- Dependable On-Off and Low-Fire Start Burners.
- Small and Popular Middle-Range Capacities.
- Selection of Automatic Operating and Safety Controls.
- Quick Change from Fuel to Fuel.





Easy Accessibility for tube cleaning and inspection is provided by swinging rear cover, and divided front cover that is readily removable without disturbing burner or accessories. Convenient hand-holes facilitate waterside inspection.



No costly stack is required for *Powermaster*. Only a small simple vent is needed to carry flue gases outside. In new construction this is an important consideration worth hundreds of dollars.

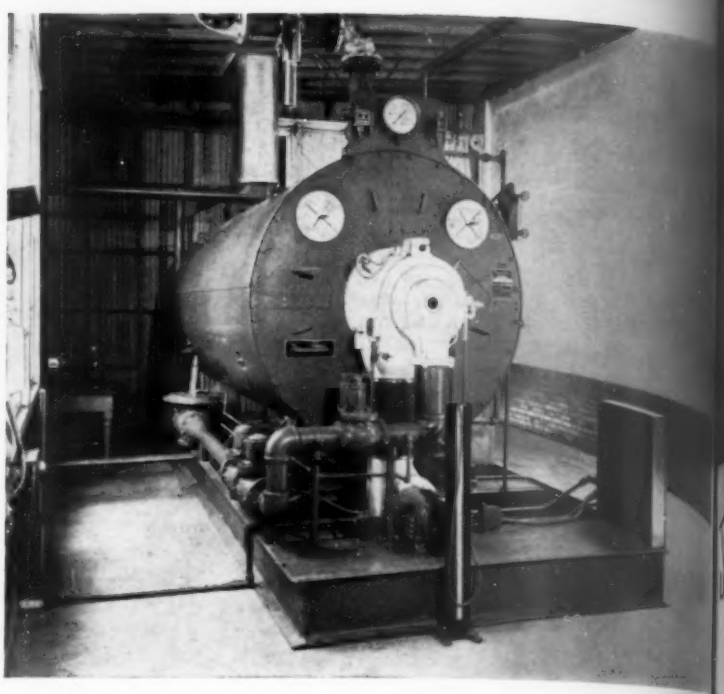


Powermaster is easy to install because it is a complete packaged design. No special foundation, or costly stack is needed. It is delivered, ready for operation as soon as fuel, water, electric, steam and flue connections are made.

Powermaster

A WORLD-WIDE CHOI... FOR LOW-COST STEA...

. . . IN SCHOOLS all over the United States, *Powermaster* Packaged Automatic Boilers are supplying steam and hot water requirements with outstanding reliability and cost-saving installation, operation and maintenance. Listed on this page are public schools, parochial schools, trade and vocational schools, high schools, private schools, and other institutions of learning that are now enjoying the many advantages of *Powermasters.*



This 200 hp. gas-fired *Powermaster* in the mechanical engineering laboratory ... Southwestern Louisiana Institute, Lafayette, La. is used for operating steam-... equipment and for instruction relating to the generation and uses of steam.

POWERMASTERS INSTALLED IN SCHOOLS

CALIFORNIA
*Ft. Bragg Elementary School, Ft. Bragg

COLORADO
Colorado School of Mines, Research Foundation, Golden

CONNECTICUT
Bethlehem School, Bethlehem

DELAWARE
*Alexis I. DuPont School, Kennett Pike, Greenville

FLORIDA
Rosenwald School, Panama City

GEORGIA
Albany State College, Albany
Bainbridge Elementary School #1, Bainbridge
Bainbridge Elementary School #2, Bainbridge
Hutto High & Elementary School Bainbridge
*West Georgia College, Carrollton
Brown Avenue School, Columbus
South Columbus Elementary School, Columbus
Winterfield Elementary School, Columbus
Hoboken School, Hoboken
Wayne County Elementary School, Jesup
Nahunta School, Nahunta
Elementary School, Rabum Gap
Chatham City School, Savannah
Eli Whitney School, Savannah
Woodville School, Savannah
West Bainbridge Elementary School, West Bainbridge

INDIANA
Mundell School, Hobart
*Emerick Manual Training High School, Indianapolis
*Speedway School No. 2, Speedway City, Indianapolis

IOWA
Denver Consolidated School, Denver
Maywood School, Waterloo
New School Building, Waterloo

MARYLAND
Paramount School, Paramount
*St. Conrad's Friary, Winchester

MASSACHUSETTS
St. Coletta's School, Hanover
Essex Co. Agriculture School, Hathorne
Sacred Heart School, Kingston

MICHIGAN
*Allegan Schools, Allegan
Athens School, Athens
Springfield School, Battle Creek
Bellevue Rural Agricultural School, Bellevue
Bard School, Benton Harbor
Concord Community School, Concord
Corunna High School, Corunna
Covert Rural Agricultural School, Covert
Decatur Elementary School, Decatur
*Austin High School, Detroit
*St. Clare of Montefalco, Detroit
Holy Redeemer School, Flint
St. Agnes Parish, Flint
Fulton School, Fulton
*Garden City High School, Garden City
Adelphian Academy, Holly
Ida School, Ida
*Inkster Schools, Inkster
*Cascades Intermediate School, Jackson
Litchfield Community School, Litchfield
Ladywood High School, Plymouth
*Plymouth Public Schools, Plymouth
Portland Elementary School, Portland
Reading Elementary School, Reading
St. Mary's of Redford School, Redford
St. Dennis's Parish, Royal Oak
St. Leonard's Parish, Warren Twp.
Walker Elementary School, Wayne

MISSOURI
Bolivar Elementary School, Bolivar
Reorganized School District #1, Buckner
*Clayton School, Clayton
New School Building, Eaglesville
Excelsior Springs School, Excelsior Springs
New High School, Lee's Summit
Elementary School Bldg., Linkville
Special School District #6, Macon
New School Building, Mercer
Elementary School, O'Fallon
Ridgeway Consolidated School District #10, Ridgeway
Bayless Consolidated School, St. Louis
Weber School District, St. Louis
*Reorganized School #1 & 9, Springfield
Waynesville School & Vocational Agricultural Building, Waynesville

NEBRASKA
St. Ann's School, Omaha

NEW YORK
N. Y. State Institute of Agriculture, Cobleskill
N. Y. State Agriculture & Technical Institute, Delhi
St. Christopher's School, Dobbs Ferry
Board of Education, Newburgh
Grand Street School, Newburgh

OHIO
*Barberton Jr. Hi School, Barberton
*Highland Jr. Hi School, Barberton
*Washington Elementary School, Barberton
*Cincinnati Conservatory of Music, Cincinnati
East Claridon School, Claridon
Garfield School, Cleveland
Ohio State School for the Blind, Columbus
Osnaburg Grade & High School, East Canton
*East Liverpool Jr. Hi School, East Liverpool
Oakville School, Mayfield Heights
*Central Catholic High School, Portsmouth
*Sharon Center School, Sharon Center
Roosevelt School, Summit City
Revere High School, Summit County
*Overdale School, Tallmadge

PENNSYLVANIA
Andalusia School, Andalusia
Slovak Girls Academy, Danville
*Fleetwood Public School, Fleetwood
Harrisburg School District, Harrisburg
Lincoln Park School, Lincoln Park
Phila. Police Academy, Torresdale
*Nether-Providence High School, Wallingford
Spring Twp. School District, West Lawn

RHODE ISLAND
St. Mary's Seminary, E. Providence

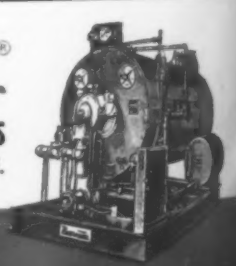
SOUTH CAROLINA
*Aiken School, Aiken
Victor Monaghan Gymnasium, Greer High Sch...
Greer

TEXAS
Tarleton State College, Stephenville

VIRGINIA
Foxcroft School, Middleburg

* Two or More Units

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In sizes to 500 HP; pressures to 250 psi.



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FACTS

to consider when selecting the Boiler for Modern School Heating

MODERATE INVESTMENT

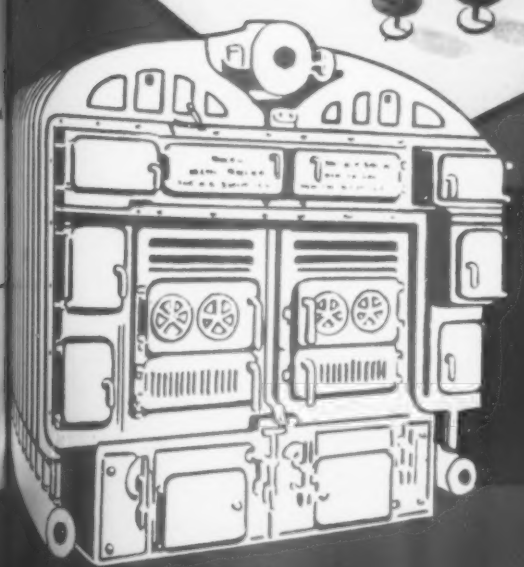
LOW FUEL COST

LONG LIFE

QUICK RESPONSE

ABILITY TO EXPAND AS THE SCHOOL GROWS

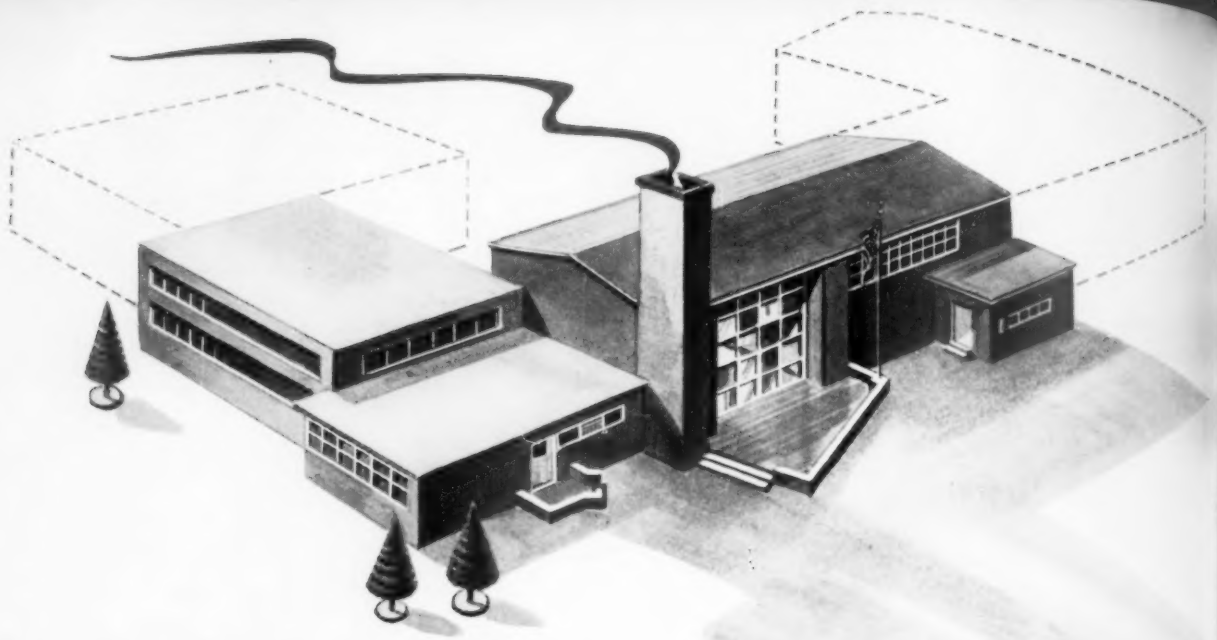
LOW UPKEEP



H. B. SMITH CO., INC.

Westfield Massachusetts

Established 1853



FUTURE NEEDS

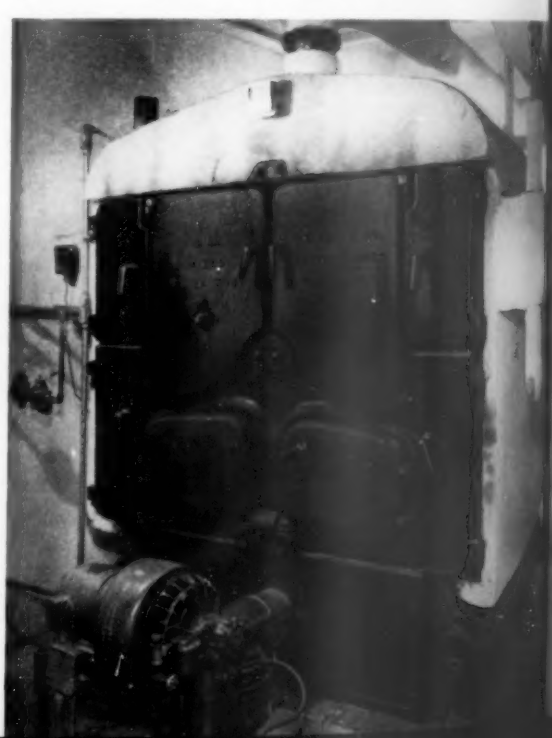
exceed initial outlay in importance

The School Board, Committee or Architect to whom the planning of a new school is entrusted naturally undertakes great responsibilities.

Chief among these, most authorities agree, is the selection of the school boiler plant. Because the operation and maintenance of the boiler system represent by far the greatest single expense to be borne — for the entire life of the school — extreme care should be observed in making this choice. Over a 20-year period, for example, the amount paid for fuel will be many times the initial cost of the boiler.

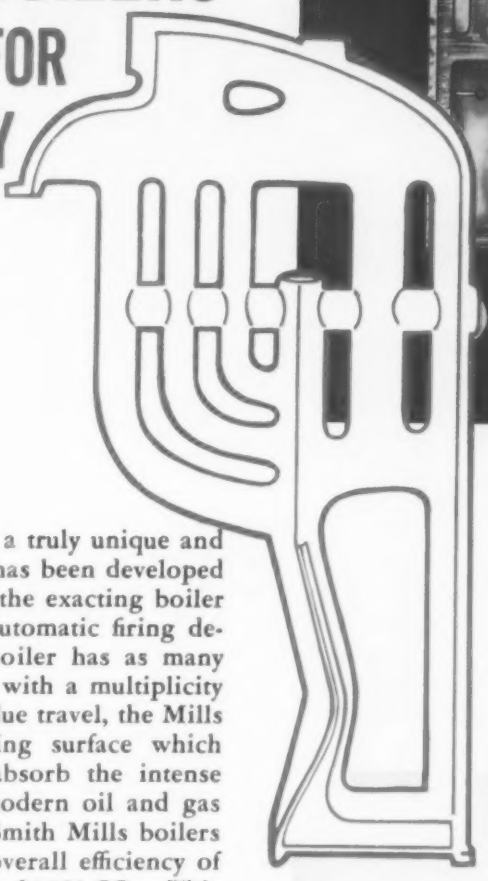
Too, the prudent planner will assume a perspective which allows a clear conception of the school's future development as regards boiler plant requirements. Many examples have illustrated forcefully that an advantage of perhaps only one hundred dollars in the boiler purchase price has proved to be false economy — a "saving" far overshadowed by subsequent costly repairs or replacement.

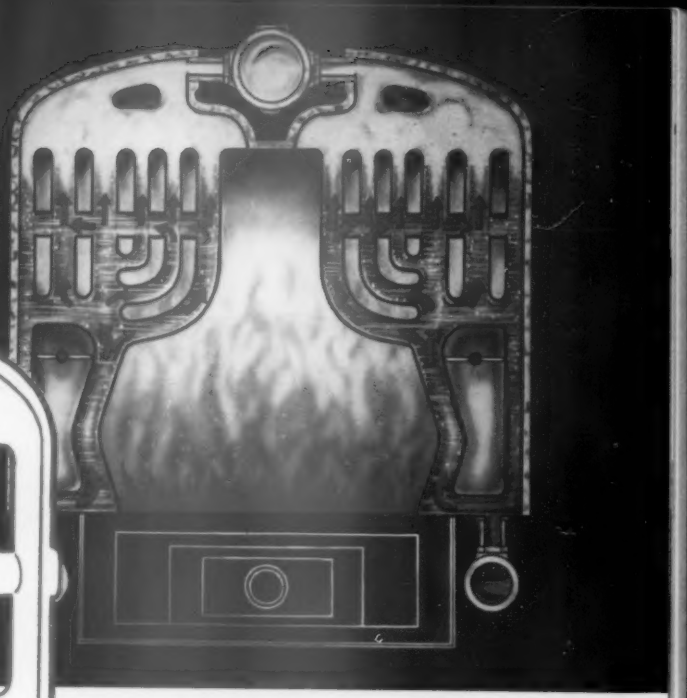
Economy of operation, low maintenance cost, long life, adaptability and ease of expansion, therefore, should be prime considerations. The following pages show, by actual case histories, how these and other important requisites are met by H. B. Smith cast iron boilers.



Typical school installation of an H. B. Smith oil-fired boiler showing compact size and absence of complicated controls.

H. B. SMITH BOILERS ARE DESIGNED FOR HIGH EFFICIENCY





Sectional view showing multiplicity of water tubes and prolonged flue travel. Note the extra heating surface for efficient absorption of intense flames generated by modern oil burners.

Left: Smith boiler section showing tubular design and large amount of heating surface.

The Mills Water Tube Boiler is a truly unique and different cast iron boiler which has been developed by H. B. Smith engineers to fill the exacting boiler plant requirements of modern automatic firing devices and systems. No other boiler has as many outstanding features. Designed with a multiplicity of water tubes and a prolonged flue travel, the Mills boiler provides the extra heating surface which must be present to efficiently absorb the intense blast-like flames generated by modern oil and gas burners. The ratings of H. B. Smith Mills boilers are conservatively based on an overall efficiency of 80% with combustion conditions of 10% CO_2. This indicates the high standard of performance which may be expected from these units.

LOWER CHIMNEYS WITH H. B. SMITH BOILERS

Because of the fact that H. B. Smith Mills boilers have such a large quantity of heating surface — more than any other boiler of comparable physical dimensions — it might well be expected that there would be greater draft loss through the boiler, and hence a higher chimney would be needed. Due to the unique Mills type design, however, actually the reverse is true. There is so little draft loss through this boiler that lower chimneys can be used and hence it is not necessary for the school architect to restrict his choice either to conventional boilers with high disfiguring chimneys or units requiring complicated induced draft mechanisms which are difficult to keep in adjustment.

H. B. SMITH BOILERS READILY CONVERTIBLE

Today most H. B. Smith boilers are installed with automatic firing devices. Still they may be converted to hand fired solid fuels, if it should be necessary to do so. Many H. B. Smith boiler owners were especially pleased with this convertible feature during the War when it often was necessary to shift from fuel to fuel.



Above: Clarksville, New York's Junior and Senior High School is an example of a recent installation, as is the Elementary School of Burlington, Connecticut, below. These schools were selected by the Architectural Forum and Architectural Record, respectively, as the two outstanding schools of their size.



PERSONAL SURVEY PROVES LONG LIFE AND LOW-COST MAINTENANCE OF H. B. SMITH CAST IRON BOILERS



In the spring of 1950, The H. B. Smith Company decided to conduct a very extensive survey to determine boiler maintenance costs. To accomplish this, it was decided to visit personally every school installation of H. B. Smith boilers within three adjoining counties in New England. None of these counties contained a city of over 200,00 people.

81 SCHOOL BUILDINGS SURVEYED

A man was assigned to this task. He, personally, visited every school boiler room in this area in which an H. B. Smith boiler was installed and made a thorough check as to its age and past history. He visited 81 school buildings in which were installed 119 H. B. Smith header type cast iron boilers. These boilers, of course, had been installed for varying periods of time, and averaged 24.1 years in age. Breakdown by age is as follows:

10 years and under	14
11 – 20 years	18
21 – 30 years	58
31 – 40 years	24
41 – 50 years	5



FAILURE CHANCES VERY SLIGHT

These boilers had a combined total of 3,176 sections. In the complete time that they have been installed, 39 sections have been replaced. The causes of these failures are as follows:

Low water	28
Flood waters	5
Strain in setting	3
Factory defect	1
Freeze-up	1
Plugged nipple	1

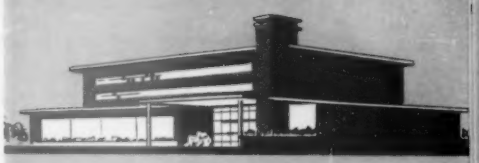
It should be noted that low water accounted for the great majority of these failures. This is a condition, of course, that is entirely due either to the failure of automatic protective devices or, what is more likely, the negligence of the man having charge of the firing or maintenance of the boiler. In only one case — a bad low water situation — had enough sections cracked to require a shutting down of the boiler plant. In all other cases the cracked sections were cut out, the headers plugged, and the boilers continued in operation until section replacement could be made in the summer.

What is truly amazing is the fact that, even with this ordinary human factor taken into consideration, only 39 sections cracked during this entire period for all types of reasons. To put this another way, with an H. B. Smith cast iron sectional boiler, there is an average section loss of 1.23% or only one chance in 81 that a section will be lost in any given year, and only one chance in three that even as much as a single section will be lost in 24 years of operation.



SPEND SCHOOL FUNDS FOR EDUCATION

Of course, most school departments reported that it was necessary to make minor repairs on their older boilers from time to time, such as furnishing new grates for coal-burning boilers, and minor items of trim, such as doors, door frames, etc. In all cases, however, these repairs were such minute items that they were always absorbed out of cash funds. It was never necessary to make any special requests to the school department or to the city for major repairs, such as replacements of steel boiler tubes. This, of course, has resulted in a very favorable feeling by school department officials who prefer to use their funds each year for educational benefits. No school department likes to have to spend its funds in constant repairs to its plant where such expense merely renews existing facilities and does not contribute to doing a better educational job. Over a period of years, with a school department running several or many schools, this saving amounts to a very appreciable sum of money.



OLD BOILERS STILL GOING STRONG

In connection with this survey, it was interesting to note that the older boilers studied; that is, those over 30 years old were all in good condition and replacements were not being considered by the school departments interviewed. In other words, this older equipment was doing a good job and still had many years of useful life ahead.





These two cast iron Smith-Mills boilers were installed in 1884, the year of Grover Cleveland's first election to the presidency. Now, some 66 years later, they still perform with customary efficiency, even though the only repairs they have undergone have been the replacement of a few grate bars.

HOW EXPANSION FEATURE OF SMITH BOILERS SAVED TIME AND MONEY FOR TWO SCHOOLS





The original cast iron boiler of the East Willis-ton, N. Y., North Side School (built in 191 was replaced in 1921 by an H. B. Smith boile When an addition to the building was con-structed in 1925 a second Smith boiler was in-stalled.

Another new wing was added in 1929 and the boilers were expanded from two 9-section to two 12-section 60 Smith series to provide for the new heating load.

The boilers were hand-fired, but in 1935 one was converted to stoker firing, using bituminous coal, and it was found that this boiler was large enough to carry the load in mild weather.

In 1949 a new wing was added, consisting of eight classrooms, a kinder-garten, athletic dressing rooms, fully equipped cafeteria, reference library, teachers' room, clinic, office and supply room. The boilers again were increased, this time from 12 to 14 sections each, and were converted for burning heavy oil.

The original sections of each boiler — after 29 and 25 years of service — are still in use today.

Many dollars were saved by the District through the use of Smith cast iron boilers, since only additional sections were necessary each time the building was enlarged, whereas if a steel boiler had been used originally it would have necessitated the purchase of another complete boiler. Also, difficulty would have been experienced in bringing in the second steel boiler due to insufficient entry space to the building. Then, to complete the building program it would have been necessary to install a third boiler (instead of the present two) at considerable expense, and again make extensive construction changes to bring the boiler into the building and to provide additional boiler room space.

PENN WYNN ELEMENTARY SCHOOL'S BOILERS KEEP PACE WITH ADDITIONS

Two10-section oil-fired 60 Smith boilers were original equipment in the Elementary School at Penn Wynn, Pa., when it was built in 1930.

In 1949 the school was expanded, and the boilers were increased to 26 sections each. At this time one boiler remained in service while the other was enlarged, and the larger boiler took over the job while the second boiler was increased in size; thus service was not interrupted. The only new parts furnished — besides new nipples — were those required to increase the capacity.

The Engineers, Architect and School Board had considered installing two steel boilers to take over the increased load since they felt that the cast iron boilers had given all the service which should be expected of them. But an inspection revealed that the Smith boilers would be good for at least another 20 years and it was decided to expand the original units — a decision that meant a saving of $3,724.



EXPERIENCE OF SIMSBURY SCHOOLS TYPICAL OF SMALL-TOWN SYSTEMS

Typical of the experience of the small-town school systems using H. B. Smith boilers is that of Simsbury, Connecticut, where three of the four schools rely on H. B. Smith installations.

In the High School an H. B. Smith unit has been in service since the school was built in 1907, with no major repairs having been necessary. When the school was enlarged in 1927 a second Smith boiler was installed. These burned coal until the mid-30's when they were converted to oil. This fuel was used until the war, when coal stokers were employed, and the system was reconverted to oil following the war.

The next oldest H. B. Smith installation is in the Central Grammar School where a Smith boiler has been in use since the school was built in 1913. This was supplemented by a second Smith unit when the school was expanded in 1918. In 1946 the original boiler was cleaned, overhauled and renippled at a total cost of $594, and is now good for another 20 years of service.

The original boiler of another make, installed when the South Grammar School was built in 1927, was replaced in 1939 by an H. B. Smith boiler, and this has not required service or repairs since.

Thus over a total period of 146 H. B. Smith boiler years in Simsbury schools, the amount spent for repairs has been only $594 (and this on a single boiler after 33 years' service) — an average maintenance cost of about $4 per year for the five Smith boilers in the school system, with no outlay to be made for repairs in the immediate future.

The Tarrifville Grammar School, fourth in the Simsbury system, is equipped with a cast iron boiler of other manufacture. The oil consumption for this school is at the rate of 4.77 gallons per square foot of steam radiation per year. The average of the other three schools with H. B. Smith boilers is 3.92 gallons per square foot per year. In other words, the H. B. Smith boilers use 18% less to operate than do the other boilers.

Not only may this small-scale example be multiplied to illustrate the comparable economy of H. B. Smith boilers in large-city school systems, but it should be remembered that the savings remain effective for the many years during which Smith boilers are supplying virtually maintenance-free service.





Right: Long-service H. B. Smith boiler installation in Simsbury High School, Simsbury, Connecticut. School building is shown above.





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Established 1853
THE MOST COMPLETE LINE IN THE WORLD OF CAST IRON BOILERS FOR

nesbitt



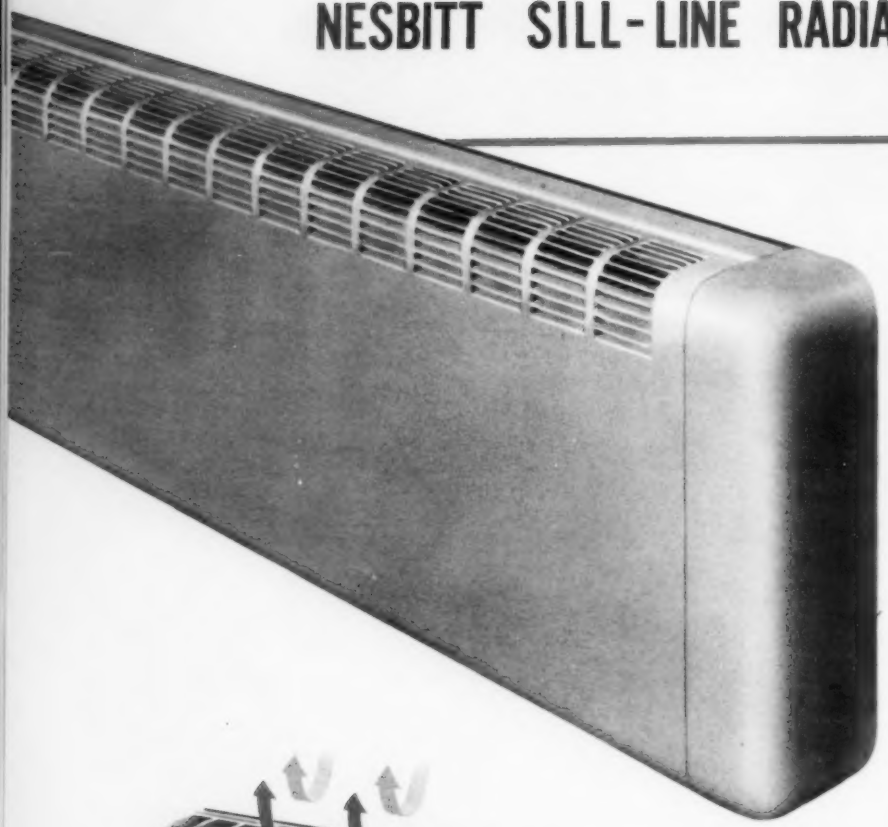
schoolhouse

sill-line radiation

. . . high-capacity perimeter convector-radiation for institutional use in specific locations where unit ventilation is not a requirement. Available in an attractive wall-hung enclosure or with modern storage cabinets.

MANUFACTURED AND SOLD BY JOHN J. NESBITT, INC., PHILADELPHIA 36, PA.
SOLD IN CANADA BY AMERICAN BLOWER CORPORATION, DETROIT 32, MICH.

NESBITT SILL-LINE RADIATION

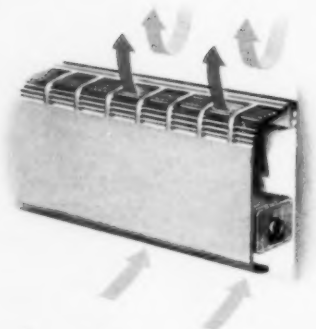


wall-hung type

Nesbitt Sill-line Radiation incorporates all the benefits of high-capacity wall-fin radiation in the first sturdy enclosure expressly styled to harmonize with contemporary building design. The graceful curves and modern lines of the wall-hung ensemble present an entirely new concept of enclosure styling to compliment any decorating scheme.

Convected air currents activated by the Sill-line heating element assure uniform temperatures from floor to ceiling and provide continuous warmth along large or extended window exposures. This effective, under-the-window perimeter heating overcomes cold downdrafts, serves to raise the temperature of the cold surfaces and, along with its own radiant heating effect, helps to decrease the radiant temperature differential between room occupants and the chilling exposures.

Sill-line is easy to install, economical to operate and widely flexible in application.



Convected warm air is discharged continuously along the length of cold exposures, overcomes chilling window downdrafts, heats uniformly throughout the room.

sill-line enclosures

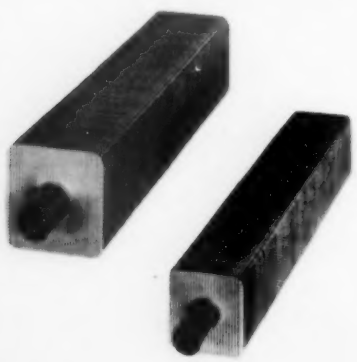
Attractive wall-hung enclosures for Nesbitt Sill-line are formed of first quality 16-gauge furniture steel. All corners are rounded and all surfaces are smooth. All metal edges are finished and all fastening devices are concealed. The louvred discharge grille is integral with the one-piece curved top-front—internally braced to give lasting service. Where enclosure lengths are joined end to end, the slightly-rounded flange on each end produces a neat joint without the need for butt straps.

Sill-line enclosures are available in three types according to size:
Type A—3⅝″ x 12″ used with Type A heating element, one row high;
Type B—4⅝″ x 13″ used with Type B heating element, one row high;
Type C—4⅝″ x 20″ used with Type B element, one or two rows high.

All three enclosure types are available in standard lengths for easy combination into any overall length.

Sill-line accessories, including inside and outside 90° corners, wall sleeve, valve compartment and end caps, are available to complete wall-to-wall ensembles, short-of-wall installations, or to continue the enclosure around right-angled corners.

sill-line heating element



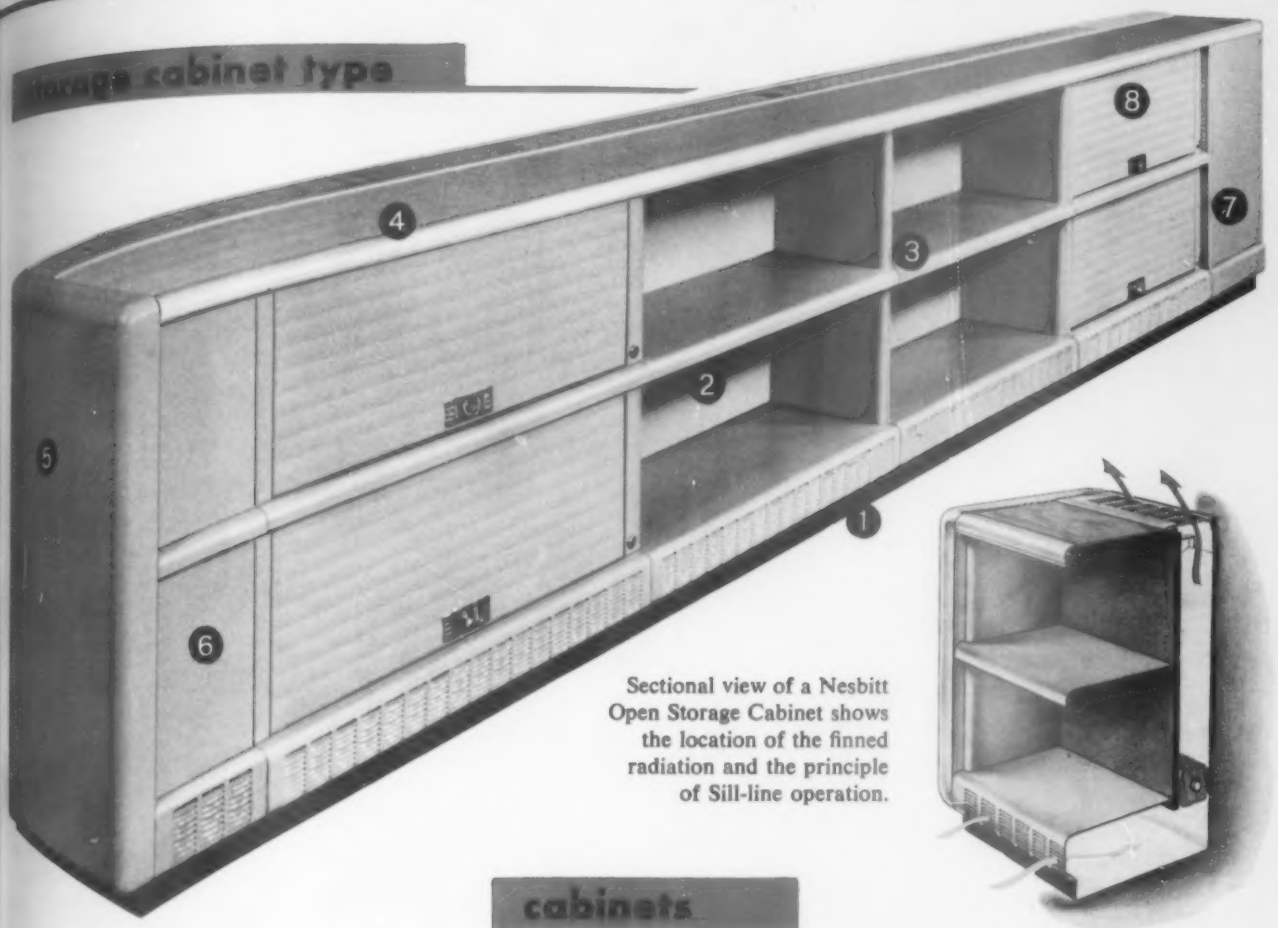
The non-ferrous heating element consists of special corrugated aluminum fins mechanically bonded to seamless copper tubing. The unique fin design provides additional transfer surface, increases rigidity, and eliminates sharp edges, thus making it easier to handle and install.

Heating Elements are made in two fin types according to size. Type A consists of 3¼″ x 3¼″ fins on a 1″ nominal (1⅛″ actual) O.D. tube, having a wall thickness of .050″. Type B has 4¼″ x 4¼″ fins on a 1¼″ nominal (1⅜″ actual) O.D. tube, .055″ thick. All fins are .020″ thick.

Nominal standard lengths assemble into continuous runs of element with overall lengths to any requirement. Swaged tube ends permit quick jointing without couplings.

Sill-line may be employed in either steam or hot-water systems and is suitable for use with any type of manual or automatic control.

storage cabinet type



Sectional view of a Nesbitt Open Storage Cabinet shows the location of the finned radiation and the principle of Sill-line operation.

cabinets

1. Open and Closed Cabinets are made in 2′, 3′ and 4′ lengths; 28″ and 32″ heights, and may be integrated in various combinations into a continuous ensemble.

2. Wide, roomy shelves accommodate books and materials up to 11½″ high.

3. Cabinets are formed of sturdy 16 gage furniture steel. All surfaces are smooth, easy to clean.

4. Continuous linoleum top and aluminum trim unite components into an integral assembly.

5. Smooth, rounded end panels finish the ensemble when terminated short of the wall.

6. Matching piping compartment provides space and access for control valves, piping or other accessories.

7. For wall-to-wall installations an adjustable fill-in section permits a continuous ensemble and encloses piping, valves and accessories.

8. Doors on closed cabinets are of sturdy construction and modern design. Easily operated and fully recessed when open, they give complete access to the interior. Individual locks and keys are available.

For the many schoolroom and office installations which require practical storage space combined with a need for heating facilities along the outside wall and window surfaces, Nesbitt Storage Units with Sill-line Radiation meets both requirements. Combining all the advantages of high-capacity finned radiation with quantity-produced, all-welded storage cabinets, this Nesbitt equipment offers for temporary or permanent buildings a low-cost heating-storage ensemble that is as outstanding in beauty as it is in economy.

Open and closed cabinets (of same height) can be joined to other cabinets, filler-pieces or piping compartments because bolt hole locations are uniform. Wall brackets for cabinets also serve as hanger supports for the radiation which is set independent of the cabinets. Ample provision for pitching is provided on long runs. Louvered discharge grille and rubber wall seal are supported entirely from the cabinet and built-in spacers on back of cabinets assure correct spacing and alignment. Insulation on cabinet backs prevents excessive temperatures in the storage spaces and results in heat savings. Recessed adjustable kick plates conceal slight variations in floor alignment. Discharge grilles and kick plates may be removed for periodic cleaning.

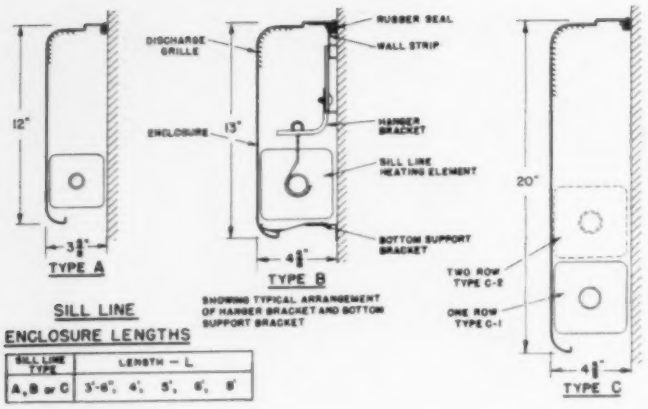
piping compartments

For short-of-wall installations a finished piping compartment, made to match the storage units, may be employed to provide space and access for control valves, piping and accessories. Sill-line storage cabinets may be used to conceal all peripheral piping, thus eliminating the need for costly pipe trenches or tunnels in slab-on-ground buildings and effecting additional savings on construction and installation.

filler pieces

For wall-to-wall installations, matching fill-in sections permit a continuous ensemble and provide space and access for controls, valves and piping. Fill-in sections (for lengths up to 30″) are adjustable at the job site to complete the ensemble from the last cabinet to a wall, or around interior building columns, and are finished to match the storage cabinet color.

wall-hung type



SILL LINE ENCLOSURE LENGTHS

SILL LINE TYPE	LENGTH — L
A, B or C	3'-6", 4', 5', 6', 8'

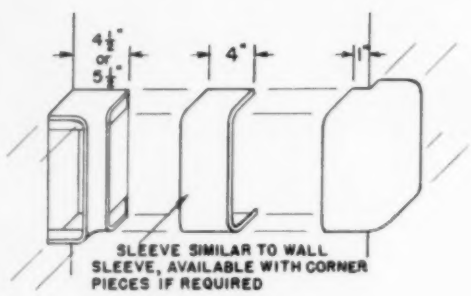
HEATING CAPACITIES—Btu per hour per lineal foot

TYPE ENCL.	RAD.	ROWS	STEAM One Psi	FORCED HOT WATER TEMPERATURE—°F 160	170	180	190	200	210	220	230
A A	A	1	1250	663	763	863	975	1075	1187	1312	1438
B B	B	1	1700	900	1038	1172	1325	1460	1615	1785	1955
C-1 C	B	1	2040	1080	1245	1408	1590	1753	1938	2144	2346
C-2 C	B	2	2290	1213	1397	1580	1787	1970	2075	2404	2635

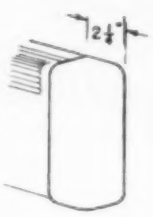
These capacities are true condensation ratings as determined by test. They do not include a factor for heating effect.

Steam heating capacities are based on one pound pressure and 65° entering air temperature. Forced hot water capacities are based on water velocities of 2.0 feet per second and 65° entering air.

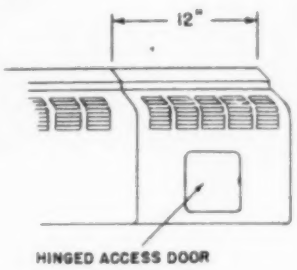
ACCESSORIES



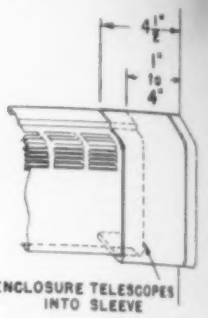
CORNER PIECES



END CAP

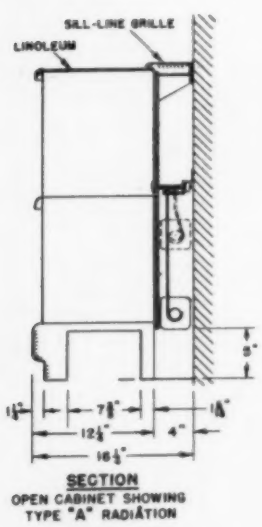


VALVE COMPARTMENT

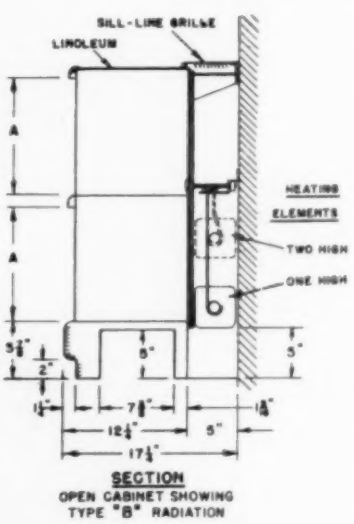


WALL SLEEVE

storage cabinet type



SECTION
OPEN CABINET SHOWING TYPE "A" RADIATION



SECTION
OPEN CABINET SHOWING TYPE "B" RADIATION

HEATING CAPACITIES—Btu per hour per lineal foot

Cabinet Height	Fin Type	No. Rows	STEAM	FORCED HOT WATER—Average Water Temperature 160°	170°	180°	190°	200°	210°	220°	230°
32"	"A"	1	1450	768	884	1000	1130	1248	1377	1522	1665
		2	1830	970	1117	1262	1427	1575	1740	1921	2105
	"B"	1	1950	1032	1190	1345	1520	1677	1852	2047	2242
		2	2265	1200	1382	1563	1767	1950	2152	2378	2605
28"	"A"	1	1315	697	802	907	1026	1131	1250	1380	1512
		2	1690	896	1030	1166	1318	1453	1605	1775	1942
	"B"	1	1775	941	1082	1225	1385	1527	1687	1864	2040
		2	2075	1100	1266	1430	1620	1785	1972	2180	2385

These capacities are true condensation ratings as determined by test. They do not include a factor for heating effect.

Steam heating capacities are based on one pound pressure and 65° entering air temperature. Forced hot water capacities are based on water velocities of 2.0 feet per second and 65° entering air.

For further information, sales assistance, or engineering data on Nesbitt Sill-line Radiation or Storage Cabinets with Sill-line Radiation, contact the nearest office of John J. Nesbitt, Inc. or American Blower Corporation, or write direct.

MANUFACTURED AND SOLD BY JOHN J. NESBITT, INC., PHILADELPHIA
SOLD BY AMERICAN BLOWER CORPORATION, DETROIT

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

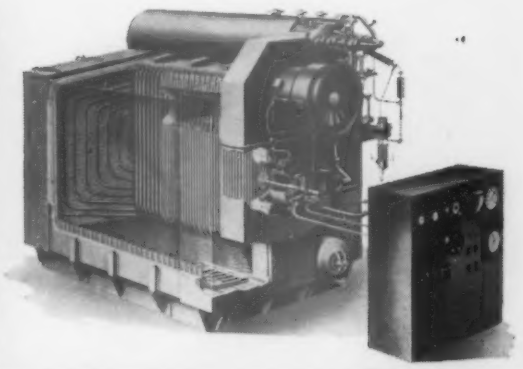
161 E. 42nd Street, New York 17, N. Y.

LOW-COST STEAM

for school requirements from 2900 to 50,000 lb/hr

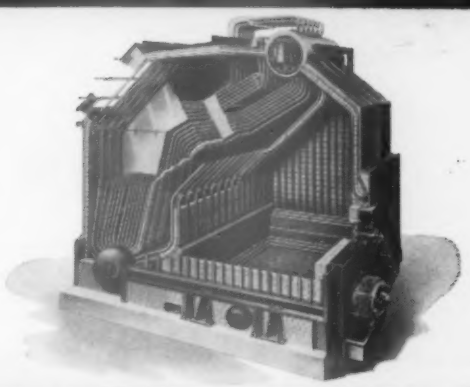
Long established as the leading choice of American schools and universities, B&W Boilers of the types illustrated, covering a wide range of steam requirements, are *service-proved . . . your proof* of lower steam costs combined with higher service life. This user endorsement is your strongest possible assurance of B&W reliability and economy.

Before planning your next installation, check with B&W for the boiler best suited to your needs. These units are available for all standard fuels, and B&W can also meet your requirements should conditions demand the use of special fuels. Write for illustrated bulletins covering the B&W Boilers in greater detail. The Babcock & Wilcox Company, Boiler Division, 161 E. 42nd Street, New York 17, N. Y.



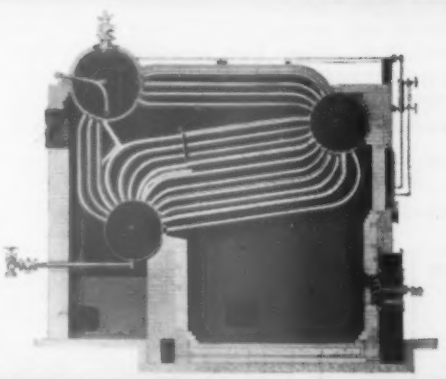
TYPE FM

Complete shop-assembled boilers delivered ready to skid or lift into position and start operating. Suitable for oil and gas firing.



TYPE FF

Self-contained boiler incorporates the latest advances used in high-capacity steam generation, but is standardized for low cost. Suitable for coal, oil, or gas firing.



TYPE H

Boilers available for any steaming capacity needed to meet normal school requirements. Suitable for coal, oil, or gas firing.

COST SAVING FEATURES

- Minimum floor space and headroom requirements.
- High fuel economy.
- Smokeless combustion.
- Adaptable to all fuels and firing methods.
- Clean, dry steam at all ratings even with high boiler water concentrations.
- Quick response to wide and heavy load swing demands.
- Easy to inspect and clean.
- High availability with least attention.

BABCOCK & WILCOX

BOILER DIVISION

6-406

BUSH MANUFACTURING COMPANY

West Hartford 10, Connecticut



FINNED RADIATION AND CONVECTORS FOR SCHOOL HEATING

FINNED RADIATION



BUSH Finned Radiation is ideal as either primary or supplementary heating source. Adaptable to any boiler heating system and any type of building construction. Light weight, inexpensive . . . suitable for exposed or concealed installation. Exclusive BUSH "finger" design on fins increases air turbulence, more effectively warming and circulating the air. Interlocking feature of fins makes for more rigid installation.

Three styles of covers available: expanded metal, flat top solid front and slant top solid front. Hangers with support brackets are available for rigid or expansion type installation.

For complete specifications request Bulletin 7208.

RATINGS (Based on 1 p.s.i. steam, 65° entering air)

Type	Tube	Fins Size	Fins No. Per Foot	Fins Material	*Rating BTU/Hr./Lin. Ft.
R1-32	1¼" IPS	3¼"	32	Steel	1020
RC1-32	1⅛" O.D. CU.	3¼"	32	Alum.	1200
T1-32	1¼" IPS	4¼"	32	Steel	1500
T1-40	1¼" IPS	4¼"	40	Steel	1600
T2-24	2" IPS	4¼"	24	Steel	1260
T2-32	2" IPS	4¼"	32	Steel	1440
TC-32	1⅜" O.D. CU.	4¼"	32	Alum.	1720
TC-40	1⅜" O.D. CU.	4¼"	40	Alum.	1860

*Steam or Water @ 215° — 1 Row High — No Cover



CONVECTOR RADIATION



Bush Convectors . . . neat and attractive . . . are proven performers. Convector elements have copper tubes expanded into aluminum fins. They have fabricated copper headers tapped for two pipe steam or hot water . . . can be provided with special tappings for one pipe steam.

Cabinets are constructed from heavy gauge steel . . . are applicable to either free standing or semi-recessed installation. Reinforced front panels are removable, outlet grilles have large free area with smooth directional louvers. Dampers are optional.

For complete specifications request Bulletin 545.

STEAM RATING — BASIC SQUARE FOOT EDR

		TP—Two Pipe Steam Depth 6"			OP—One Pipe Steam 8"		
Length	Height	20"	24"	32"	20"	24"	32"
20"	TP	13.4	15.4	17.1	17.2	19.7	22.0
	OP	12.8	14.7	16.3	16.9	19.4	21.6
28"	TP	20.3	23.5	26.0	26.4	30.5	33.8
	OP	19.6	22.7	25.1	26.2	30.2	33.5
36"	TP	27.5	31.5	35.0	36.0	41.1	45.7
	OP	26.8	30.7	34.1	35.7	40.8	45.4
44"	TP	34.4	39.5	43.8	45.0	51.8	57.5
	OP	33.6	38.7	42.9	44.7	51.5	57.2
56"	TP	45.2	51.9	57.6	59.5	68.4	76.0

Rating Basis: 1 psi steam, 65°F entering air. Also available in 4" and 10" depths and in lengths 16", 24", 32", 40", 48" and 64".

BUSH MANUFACTURING COMPANY

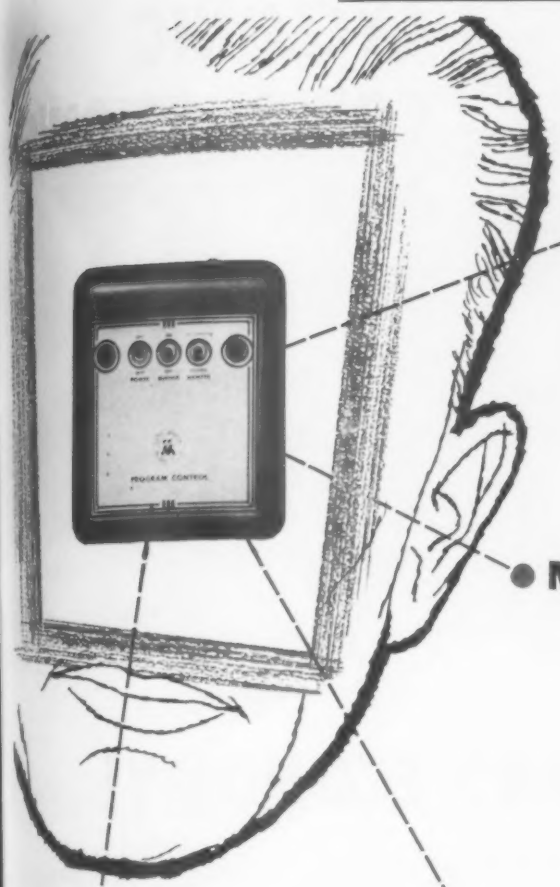
WEST HARTFORD 10, CONNECTICUT

COMBUSTIONEER DIVISION

The Steel Products Engineering Company

1354 W. Columbia St., Springfield, Ohio

Gas Burners • High and Low Pressure Oil Burners • Oil Furnaces • Stokers • Humidifiers



Like a "magic brain"...

COMBUSTIONEER'S

Modulating Controlled Stokers

SAVE FUEL! SAVE TIME! SAVE MONEY!

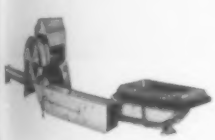
Combustioneer's Modulating Controlled Stokers *automatically* feed coal and air to the fire at *variable* rates in order to meet exact load requirements. Coal feeding starts slowly, accelerates, tapers off, or stops —*depending on the load demand.*

This "magic" control system levels off peaks and valleys in coal feeding, prevents over-firing and waste of coal! It keeps more heat in the boiler . . . uses less fuel during "off" periods . . . saves operator's time.

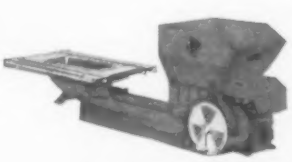
Furthermore, Combustioneer's agitating transmission keeps the fire-bed always open and free-burning . . . the Combustioneer automatic respirator controls air delivery for maximum combustion efficiency, and smoke-free stacks.

Complete Stoker Line

Combustioneer Hopper and Bin-Feed Models range in capacity from 9 to 1000 lbs. per hour. They are precision made, rugged, giving long life in hard service.



Bin-Feed Model No. 15



Hopper Model No. 50

Write today for your copy of Architect's Heating Manual containing complete Combustioneer data and specifications.

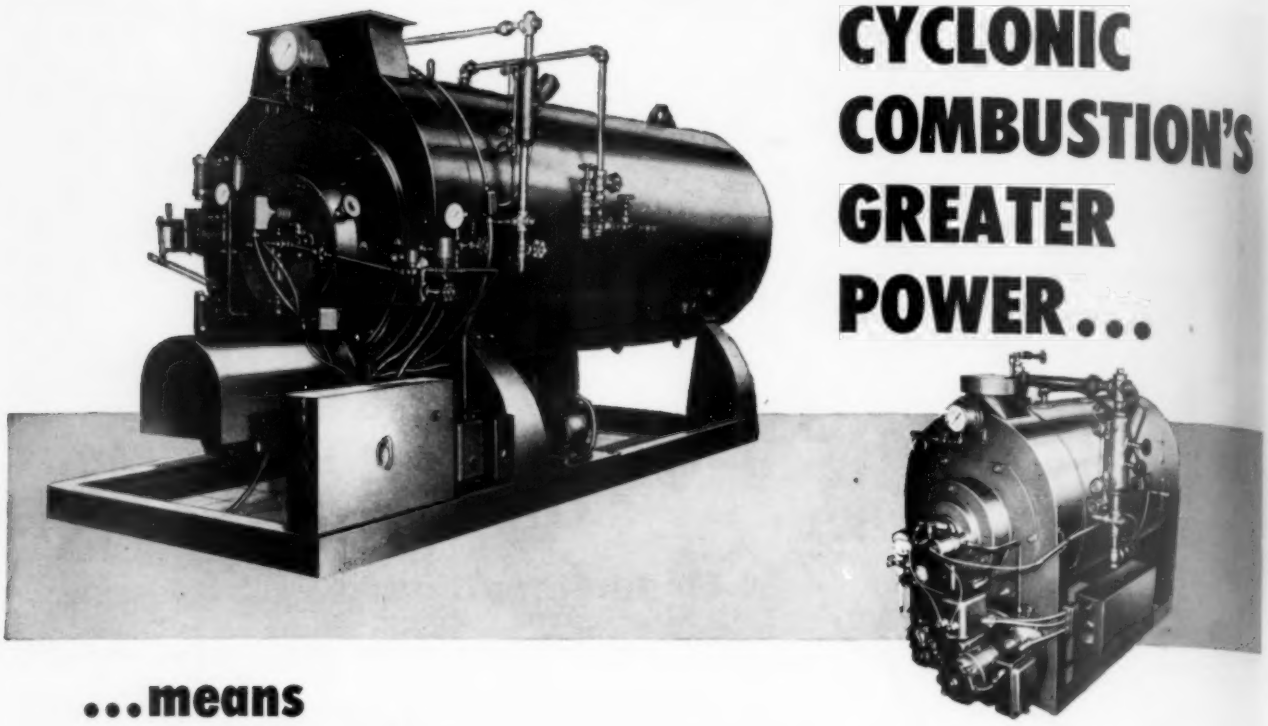
Combustioneer DIVISION

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CYCLOTHERM

DIVISION UNITED STATES RADIATOR CORP.

Oswego, N. Y.



CYCLONIC COMBUSTION'S GREATER POWER...

...means

GREATER ALL-ROUND ECONOMY!

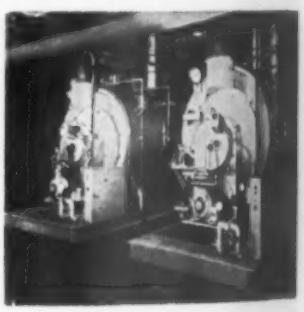
Cyclonic Combustion, revolutionary new flame control used exclusively in Cyclotherm Steam Generators, produces 66% more power per sq. ft. of heating surface . . . reduces heating space requirements from 5 to just 3 sq. ft. per boiler horsepower. This means compact Cyclotherm generators with complete fibre glass boiler insulation save up to one-third the space required for conventional generators . . . important where no basement is available and space is at a premium.

Cyclotherm generators eliminate the need for stacks, boiler foundations, extra insulation and excavation. Cyclotherm arrives complete . . . 5 easy connections—fuel, electricity, water, steam and a simple flue—and Cyclonic Combustion is ready to generate steam for any purpose.

Cyclotherm uses less fuel because the Cyclonic flame consumes every particle of fuel in the combustion chamber—itself a complete heat transfer unit. Burning gas or oil, Cyclotherm's smokeless combustion attains such a high rate of heat transfer that just a single pass of return tubes is required to deliver greater than 80% efficiency.

The simple construction of Cyclotherm generators saves up to 50% on maintenance cost and time. The main combustion chamber is automatically swept clean by the revolving vortex of flame—the single pass of return tubes is easily accessible by a door on the rear of the Cyclotherm. Inspection and cleaning is a minor operation with no time loss caused by boiler shutdown.

On large installations where requirements exceed 500 HP, sizable fuel savings can be obtained by battery installation. Based on analysis of your steam requirements, a number of units would be recommended which collectively add up to your peak steam demand. An automatic battery control panel distributes the load for maximum operating economy and brings in additional steam generating capacity as needed. Cyclotherm boilers are designed for 18 through 500 HP, 15 to 200 psi operating pressure.



For more information about Cyclonic Combustion, write Dept. ASU.

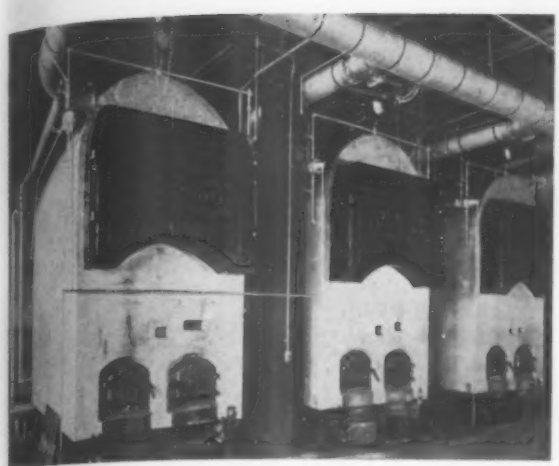
FARRAR & TREFTS, INC.

Established 1863

20 Milburn St., Buffalo 12, N. Y.

Sales Offices in Principal Cities

BISON COMPACT BOILERS



Three Bison Compact Boilers
Olean High School, Olean, N. Y.

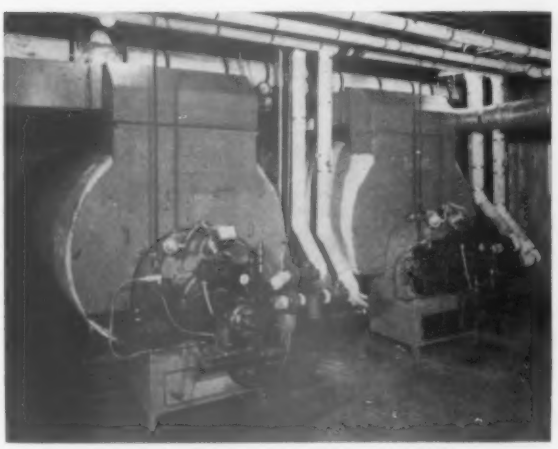
- The F&T Bison Compact Boiler is built to produce heat and power economically: reasonable as to cost, economical in operation and adaptable to all fuels, whether fired by hand or mechanically.
- This steel boiler is of welded construction, requiring a minimum of floor space. It is easily and inexpensively installed. It comes complete, ready for piping, with brick work eliminated in all types except oil fired. Smoke outlet is located in rear.
- Efficient operation is possible as soon as installed with no tricks or special firing requirements to be learned by the operator. Cleaning is simply and easily done through handy cleanout doors. Handholes and manholes are located for easy use and convenience.
- The greatest possible area is exposed to the flame in the combustion compartment. The fuel burns quickly and efficiently, producing steam or hot water in the quickest possible time with the least amount of effort and cost.
- These boilers have been designed so as to have a large furnace volume, the proper volume of water, just the right amount of steam liberating surface, the correct volume for steam storage and a balanced circulation. There is no loss of heat through friction, for water and steam circulation is clear of any obstructions. The result is a remarkably steady water line—A BALANCED BOILER.

Standard sizes range from capacities of 2,200 to 42,500 sq. ft. steam radiation.

SCOTCH WET ARCH BOILERS

- Scotch Wet Arch Boilers are designed for oil, gas or solid fuel firing and for economical and efficient performance.
- This steel boiler has all seams welded. The wet arch eliminates refractory tile at top of rear combustion chamber. The furnace is completely surrounded by water which permits immediate maximum heat transfer and absorption. The steam space extends the entire length of the boiler due to the fact that the surface above the rear combustion chamber is covered with water. This results in a large steam space and disengaging area.
- This boiler is self-contained and can be moved easily and installed on two saddles. All parts are readily accessible for inspection and cleaning. No expensive foundations or pits are required. No external brickwork is needed. The special design of this boiler with wet arch and large furnace volume, results in efficient heat absorption at a minimum cost. Of short length and low height, with a low water line, this compact boiler can be installed in small spaces where no other type will fit.

Standard sizes range from capacities of 3,160 to 42,500 sq. ft. steam radiation.



Scotch Wet Arch Boilers
Wilson School, Lackawanna, N. Y.

F & T Boilers Built to ASME Code, S.B.I., and State and Insurance Inspection Requirements.

FEDDERS-QUIGAN CORPORATION

HEATING DIVISION

Hancock and Lalor Streets, Trenton 7, N. J.

Heat Transfer Specialists Since 1896

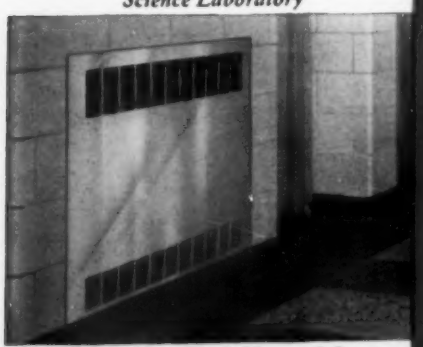
FEDDERS Unit Heaters and Radiation

Men responsible for designing, building and maintaining educational buildings depend on Fedders heating equipment for efficient, rugged, economical service. Heating equipment illustrated below is typical of the wide variety available in sizes, capacities and types to fit school requirements.

● FOR EVERY SCHOOL AND INSTITUTIONAL NEED



Showing Fedders Convector Radiators in Science Laboratory



Showing Fedders Flush Mounted Convector Radiator in School corridor



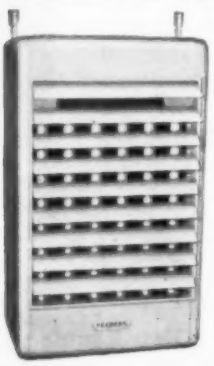
Quick warm-up of Fedders Unit Heaters combines comfort and economy in gymnasiums when used intermittently



SERIES 17 HORIZONTAL — Handsome appearance, rugged construction, high efficiency heating element and quiet, rubber-mounted fans. Built with directional flow louvers to control placement of heated air. Capacities from 93 to 1225 EDR.



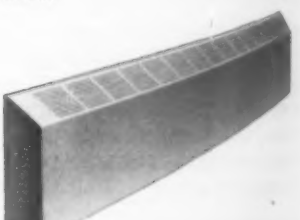
SERIES 16 DOWNBLOW—Deliver heat down from relatively high locations and for lower levels with spot conditions. 230 to 2050 EDR.



SERIES 18 GAS-FIRED—Compact, self-contained units for natural or manufactured gas. Thousands of uses. 183 to 667 EDR capacity.



FEDDERS CONVECTOR RADIATORS—Ideal for new construction. Provide more uniform temperatures from floor to ceiling. High efficiency heating elements made of copper tubes and aluminum fins. Covers designed for free-standing, semi-recessed, flush or wall mounting. Complete range of standardized types, sizes and capacities.



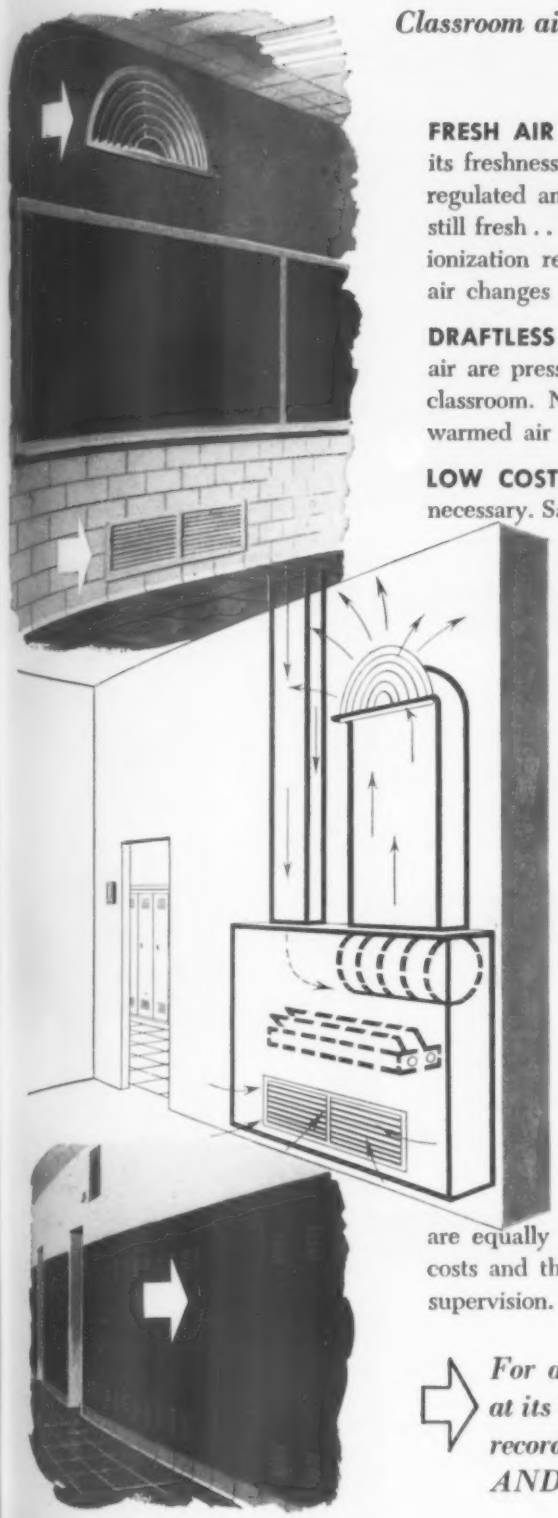
FEDDERS WALL RADIATION—For heavy-duty institutional service. Available with flat or sloping top covers. Steel or copper heating elements.

Also a complete line of Baseboard Radiation

● Write Dept. AS1 for complete details and free copies of Catalogs

THE RUSSELL R. GANNON CO., INC.

Manufacturers of Heating and Ventilating Equipment
to Fit the Needs of Each Individual School
Norwood 12, Ohio



Classroom air with outdoor freshness . . . every day . . . with the Gannon Method of temperature equalization!

FRESH AIR . . . Fresh air, brought directly from the outdoors, never loses its freshness by passing over heating coils. It is mixed, in thermostatically-regulated amounts, with heated re-circulated air, then pressure-diffused . . . still fresh . . . into the classroom. Proper balance of positive and negative air ionization remains undisturbed . . . a most important point. Deodorizes by air changes alone (complete air change every five minutes).

DRAFTLESS . . . In the Gannon Method, large volumes of fresh, conditioned air are pressure-diffused from wall to wall and from ceiling to floor of the classroom. No blasts of hot or cold air are possible. Positive pressure of warmed air prevents window drafts or drafts from any source.

LOW COST . . . Only minimum controls required. No steam limit control necessary. Saves valuable space in every classroom. Heated by short, straight pipe runs down corridors only. No operation or maintenance "problems" for janitor or heating engineer. Serviced entirely from corridor. Simple, inexpensive alteration for summer air conditioning . . . heat and cool with same unit. Fresh air drawn from roof more directly and inexpensively than from frequently-obstructed side wall grilles.

QUIET . . . Quiet operating low speed centrifugal fans supply conditioned air through sound-insulated plenum. Dampers operate without a sound.

FLEXIBLE . . . Gannon Corridor-Type Units can be fitted easily into a line of lockers, flush with face of lockers. They can also be installed in any convenient space at top of lockers, or suspended from the corridor ceiling.

HYGIENIC . . . Air-borne bacteria can be killed with a simple electrical or chemical attachment. No major alteration of equipment is required.

SPECIFIED . . . repeatedly, by Architects and Engineers who have found their first installation of the Gannon System to be the simple, natural, trouble-free answer to the problem of providing health and comfort for the children in school. They are equally enthusiastic about low installation, operation and maintenance costs and the fact that Gannon Units require a minimum of attention and supervision.

For a better understanding of schoolroom air conditioning at its best, write for complete specifications and performance records of GANNON CORRIDOR-TYPE HEATING AND VENTILATING UNITS.

THE INTERNATIONAL BOILER WORKS CO.

200 Birch Street, East Stroudsburg, Pennsylvania

Boiler Builders Since 1886 **Sales Offices in Principal Cities**

INTERNATIONAL

WATER TUBE HEATING BOILERS

There's an INTERNATIONAL Water Tube Boiler for every School requirement, from the 55 room Milford, Conn. High School shown at right, to the largest University or the smallest Grammar School.

Water Tube design assures . . . *quick steaming, high overload capacity, low cost operation with all fuels, compact construction and dependable service.*



950 student capacity Milford High School, Milford, Conn.
Inset shows three of Milford High School's four International Heating Boilers.

PERFORMANCE

Quick steaming . . . the steeply inclined water tubes carry steam to boiler outlet in a rapid and continuous flow.

Unusual overload capacity . . . mechanically fired International Water Tube Boilers provide extra capacity for heavy overloads. Normal continuous operation at 175-200% of nominal (hand fired) rating is not uncommon when the boilers are mechanically fired.

Maximum heat absorption . . . cross flow of gases over the tubes in long three pass travel effects marked savings by using more of the heat released by the burning fuel.

DEPENDABLE CONSTRUCTION

Every International Boiler is built in strict accordance with the ASME code and all State Insurance Inspection requirements.

Complete range of sizes . . . type C Boilers in SBI rated sizes, from 2,200 to 42,500 sq. ft. steam. Capacities to 70,000 sq. ft. with type IDL Induced Draft Units.

Member

SBI

Reg. U. S. Pat. Off.

For descriptive catalog write to:

THE INTERNATIONAL BOILER WORKS CO.
200 Birch Street
East Stroudsburg, Pennsylvania

peak performance at low cost

For new schools or existing school renovation, International offers three boiler types. For buildings with adequate entry there's the type C Boiler seen in cutaway view of one of Milford High School Boilers at right, which shows turbulent, three pass gas travel over the water tubes . . . the key to high overload capacity and real fuel savings.

replacement boilers save cutting building walls

When the limiting dimension for entry into the boiler room is the width of a door or passageway, the type C Twin-Section Boiler is recommended, as shown at right. When entry is extremely limited, the field erected type KD Knocked Down Water Tube Boiler prevents cutting and patching of building walls.

induced draft boiler eliminates stack

With the type IDL Induced Draft Boiler at right, modern School architecture is enhanced by the absence of a stack. The induced draft fan guarantees normal operation to 200% of nominal rating. Exhaust gas is vented by a small duct terminating just above building roof. Emergency grates can be installed in base ahead of burner, using coal or wood in event of fuel or power failure. Thus the School is insured against lack of heat.



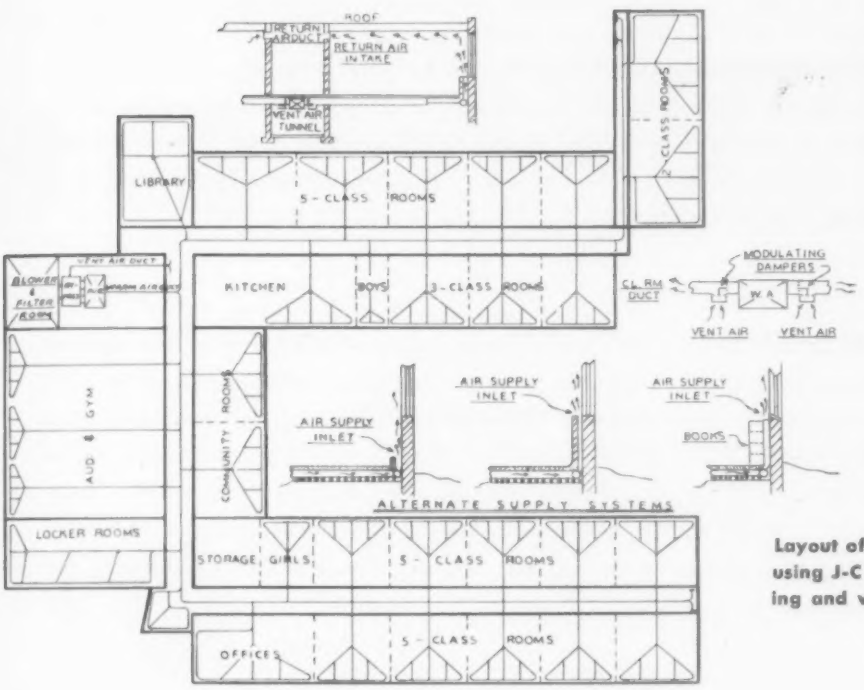
JACKSON & CHURCH COMPANY

Executive Offices: 321 North Hamilton Street, Saginaw, Mich.

Manufacturers of

AMERICA'S LARGEST & MOST COMPLETE WARM AIR HEATING LINE

SEVEN COMPLETE AIR CHANGES EVERY HOUR . . . ALL THE ADVANTAGES OF PERIMETER HEATING AT LOWER COST . . . WITH J-C FORCED WARM AIR FURNACES



Layout of typical school building using J-C forced warm air heating and ventilating system

SCHOOL CHILDREN and teachers no longer have to contend with dry, stale air or chilly drafts characteristic of outmoded heating systems. Now it's possible to give them fresh, properly balanced air . . . distributed uniformly along the entire outside wall to block chilly downdrafts . . . with a J-C furnace, featuring perimeter type heating and ventilation.

HOW IT WORKS: The J-C forced warm air system blends desired proportions of fresh outdoor air and room air (100% outdoor air if desired), heats it to the proper temperature and delivers it to the classroom through ducts under the floor. After warming the floors, air may be introduced through floor registers, elevated registers or bookshelf-register combinations. Wiring and piping tunnels under the floor are utilized as duct space for delivering air to feeder ducts.

J-C POWERATED FURNACES are engineered to make possible temperature rises to 100°F and air volumes from 4,000 CFM to 45,000 CFM . . . with any fuel.

COST-SAVING FEATURES of this system make further investigation a must for the school architect. Write J-C's engineering department for more details.

JOHNSON SERVICE COMPANY

Main Office and Factory—Milwaukee 2, Wisconsin

DIRECT BRANCH OFFICES IN PRINCIPAL CITIES

AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL SYSTEMS • MANUFACTURING • PLANNING • INSTALLING

Johnson temperature and humidity control systems are completely automatic, making use of air under pressure to actuate various controlling devices which regulate temperature and humidity. Johnson Individual Room Control or Zone Control is readily adaptable to all types of heating and ventilating systems—radiators, unit ventilators and heat delivery ducts. In any school, small or large, old or new, Johnson Control is equally applicable. Dependable accurate control is assured.



T-400 Single Room Thermostat

SINGLE TEMPERATURE THERMOSTATS—Johnson single temperature room thermostats have a bimetallic sensing element which responds immediately to temperature changes. Furnished either reverse or direct acting for proportional or two-position action, these thermostats are available in a large variety of finishes to harmonize with all color schemes. Open or concealed adjustment available on all thermostats. Also furnished with suitable guards.



T-460 "Dual" Room Thermostat

TWO-TEMPERATURE THERMOSTATS—"*Dual*" Thermostats are equipped with two separate bimetallic sensing elements which allow two completely independent settings. Changing from "occupancy" to "non-occupancy" temperature is accomplished automatically by changing the supply pressure. Available also with manual change-over. Each thermostat may be returned to its original "occupancy" control point if desired, even though the entire system is on "non-occupancy", by merely pushing a button on the cover. Furnished for proportional action only, direct or reverse acting with various adjusting features. Finishes available to fit any color scheme.



T-333 Airstream Thermostat

REMOTE BULB THERMOSTATS—Thermostats with liquid-filled capillary elements are designed to control the discharge air temperature in unit ventilators or blast heating coils. All instruments have sensing elements directly in the discharge airstream to assure quick, accurate response. These instruments may be used where it is not practical to have the sensing element housed within the instrument cover.

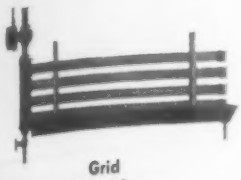


T-900 Master Thermostat

"MASTER-SUBMASTER" CONTROL—The Johnson "Master-Submaster" method of control utilizes the principle of a Master thermostat resetting the control point of a Submaster thermostat in accordance with the temperature at the Master thermostat. Using a high sensitivity thermostat as the Master, very accurate, stable control is produced with the Submaster controlling at a point determined by the Master. This method assures minimum deviation in temperature even though wide variations in steam pressure may occur. It also eliminates hunting.



T-901 Submaster Thermostat



Grid Humidifier



H-103 Room Humidostat

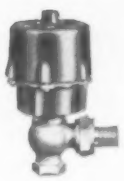
HUMIDOSTATS AND HUMIDIFIERS—Room humidostats are actuated by hygroscopic elements which are affected by the relative humidity of the air to which they are exposed. The elements most commonly used for school installations are made of horn or balsa wood. These humidostats are used in conjunction with humidifiers to keep the relative humidity at a constant value. Humidifiers are available in grid or pan types.



V-107 3-Way Mixing valve



V-103 Coil Valve

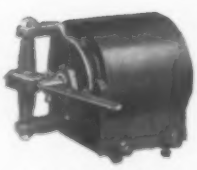


V-153 Sylphon Convector Valve

VALVES—Johnson Valves which are controlled by thermostats or humidostats are available in a variety of styles and sizes to fit all applications. All Johnson Valves, from large coil valves down to the small convector valves, are noted for their rugged construction, long life and accurate operation. Available with rubber diaphragm or "Sylphon" bellows operators, which assure positive seating, these valves are designed to give dependable trouble-free control. Valves with flat discs or modulating plugs are available. There is a wide range of finishes for exposed radiator valves.



D-251 Piston Damper Operator



D-104 "Sylphon" Damper Operator

DAMPER OPERATORS—Johnson Damper Operators are available in two standard models, the "Sylphon" and Piston type. The seamless "Sylphon" bellows operators are used to operate dampers in unit ventilators where short strokes are required and are available in four sizes. Piston type damper operators are used on large dampers and provide full power and long stroke for proper positioning. Also available in four sizes.



D-201 Mixing Damper

DAMPERS—Dampers find a variety of uses in heating and ventilating systems, such as admitting the required quantities of tempered and warm air to a heating duct, controlling the amount of outdoor air received, regulating the air leaving a unit ventilator and controlling roof ventilators. They are designed for quiet operation at all times, whether large or small.

PETRO

3114 West 106th Street, Cleveland 11, Ohio

Quality Heating and Power Equipment since 1903

PETRO

REG U S PAT OFF

INDUSTRIAL AND COMMERCIAL OIL BURNING SYSTEMS FOR AUTOMATIC, SEMI-AUTOMATIC OR MANUAL OPERATION

FOR UNHEATED COMMERCIAL OILS:

Model W-A: Automatic ignition with synchronized control of oil and air.

Model W-SA: Automatic variation of firing rate with manual ignition. Or manual variation with manual ignition.

FOR HEATED OILS: HEAVY NO. 5 (Models W-A-E and W-SA-E); BUNKER "C" NO. 6 (Models W-AH and W-SAH)

Models W-A-E; W-AH: Automatic ignition with synchronized control of oil and air, and automatic control of oil heaters.

Models W-SA-E; W-SAH: Automatic variation of firing rate with manual ignition. Or manual control of oil and air with manual ignition. Manual control of heaters.

PETRO MODEL W ROTARY-CUP OIL BURNERS:

A Petro Model W consists of a self-contained assembly of fan, pump, rotary cup atomizer and all oil and air adjustment apparatus. It is either direct-driven by means of a built-in motor, or belt-driven from motor mounted on burner housing. Interlocking oil and air control mechanism permits operation at any point within the burner's minimum and maximum range.

MODEL W-A-E FOR HEAVY NO. 5 OIL REQUIRING ONLY MODERATE PREHEATING:

Petro Model W-A-E meets today's growing need for a burner to handle the more viscous No. 5 oil that is becoming increasingly available. Such oil has a viscosity from 300 seconds Saybolt Universal at 100°F to 40 seconds Saybolt Furol at 122°F.

A Petro Model W-A-E is equipped with a thermostatically-controlled electric heater. In all other respects it resembles the popular economical Petro Model W-A for burning cold No. 5 oil. It is supplied in all Model W-A sizes except W-8½, W-9 and W-10.

THERMAL VISCOSITY CONTROL:

Dependable and accurate control of oil viscosity — and hence of oil flow and combustion efficiency — is provided through automatic control of oil temperature. This basic principle underlies the Petro Thermal Viscosity Control System.

MODULATED FIRE CONTROL:

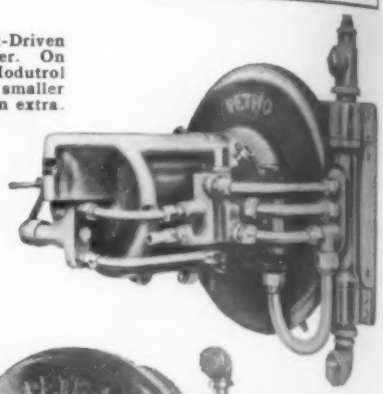
Standard equipment on Model W-5 and larger burners, and supplied as an extra on smaller sizes when so ordered, the Petro Modulating Control provides accurate and completely automatic control of firing operation.

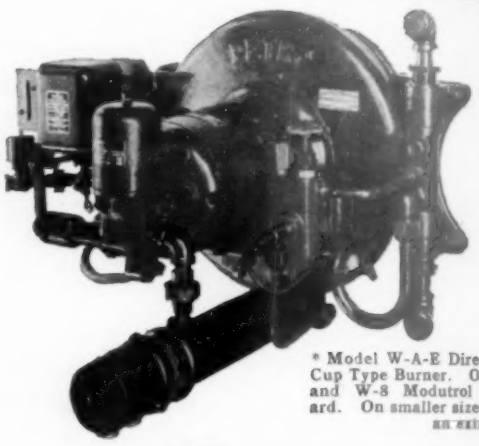
CAPACITIES OF PETRO MODEL W OIL BURNERS AT 70% BOILER EFFICIENCY

Burner Size	Motor Horsepower	Maximum Gals. per Hour	Rated Capacity Boiler Horsepower	Steam Radiation, Sq. Ft., E.D.R.
W-2½	⅓	11	34.4	4810
W-3	½	15	47.0	6560
W-4	¾	25	78.5	10940
W-5	1	35	110.0	15300
W-6	2	50	157.0	21880
W-7	2	70	220.0	30600
W-8	3	100	313.6	43750
W-8½	3	120	376.0	52500
W-9	3	145	454.7	63250
W-10	5	200	625.0	87000

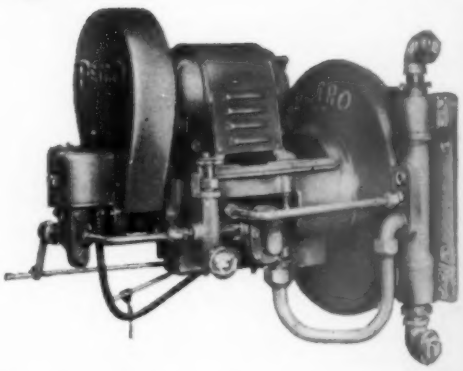
NOTE: Model GW Combination Gas and Oil Burners are available in sizes from 3,750,000 Btu per hour heat release to 15,000,000 Btu per hour. The oil side consists of the Model W Rotary-Cup Burner mounted on a refractory lined air register which also contains the Gas Burner. A premix blower supplies gas and primary air to this burner to give short clean fires. Change over from one fuel to the other may be accomplished in a few seconds, automatically if desired.

* Model WD-AH Direct-Driven Rotary-Cup Type Burner. On W-5 and larger sizes, Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.





* Model W-A-E Direct-Driven Rotary-Cup Type Burner. On W-5, W-6, W-7 and W-8 Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.



* Model WO-A Belt-Driven Rotary-Cup Type Burner. On W-5 and larger sizes, Modutrol Firing is standard. On smaller sizes, it is supplied as an extra.

* All Petro Model W burners are available in either direct- or belt-driven motor types.

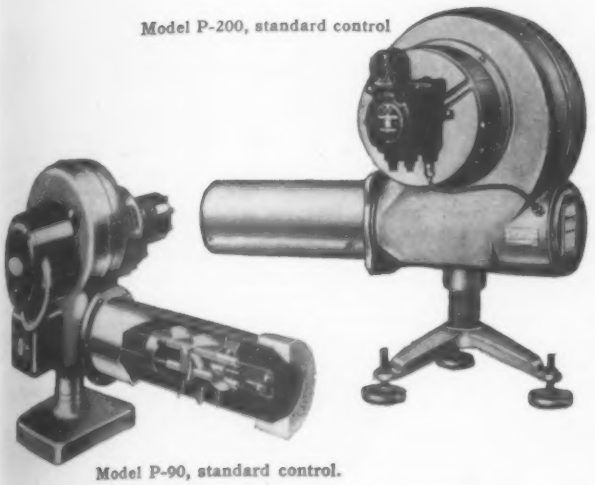
PETRO

3114 West 106th Street, Cleveland 11, Ohio

Quality Heating and Power Equipment since 1903

PETRO REG. U.S. PAT. OFF.

INDUSTRIAL AND COMMERCIAL OIL AND GAS BURNING SYSTEMS FOR EVERY NEED



Model P-200, standard control

Model P-90, standard control.

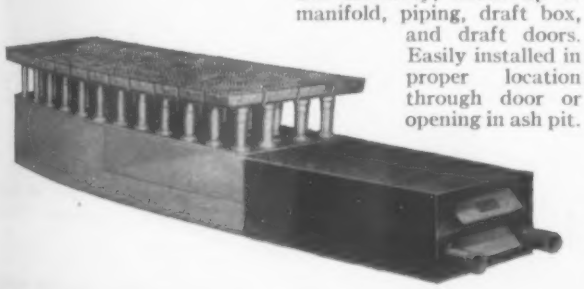
Electronic controls available for all Petro burners.

PGV SERIES COMMERCIAL — INDUSTRIAL GAS BURNERS

The Petro Commercial Gas Burner is available in a wide range of stock sizes and capacities, with standard combinations of burner heads, providing 450,000 BTU input up to 11,520,000 BTU. Larger sizes can be provided. This wide range of sizes and variable capacities makes it possible to automatically fire all sizes of industrial and commercial furnaces and boilers with gas.

No refractory combustion chamber liner is used with the burner. As a result, all the heat is immediately transferred directly to the furnace or boiler, and the response to the demand for heat is instantaneous.

When the recommended controls are used, the burner is made step-acting and modulating by relays in the circuit so that various burner sections come on in sequence instead of all at once.



Burner comes complete in one assembly, made up of manifold, piping, draft box, and draft doors. Easily installed in proper location through door or opening in ash pit.

LARGE CAPACITY BURNERS, MODELS P-90, P-90E, P-200, P-200E:

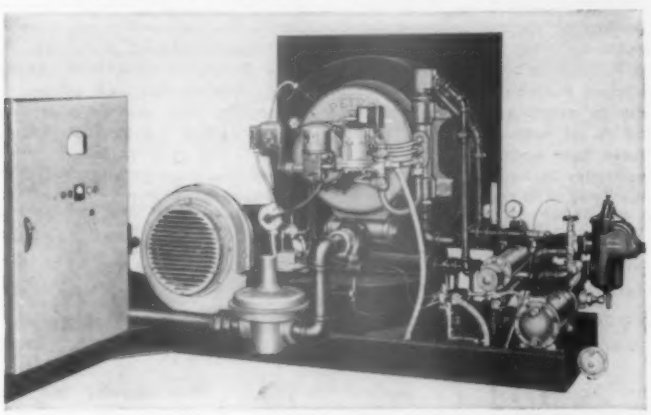
In addition to domestic heating in large residences, these Petro burners have a wide field of application in many commercial and public buildings such as schools, churches, stores, garages, and apartments.

CAPACITY OF PETRO PRESSURE ATOMIZING BURNERS

Burner Model	Nozzle Size Gals. per Hr.	Total Capacity*		Approximate Shipping Weight
		Steam Sq. Ft.	Hot Water Sq. Ft.**	
P-90	5 to 9	1750 to 3150	2800 to 5050	130
P-90E	5 to 9	1750 to 3150	2800 to 5050	130
P-200	9 to 20	3150 to 7000	5040 to 11200	180
P-200E	9 to 20	3150 to 7000	5040 to 11200	180

* Total capacity equals standing radiation, plus piping loss, plus pickup, plus hot water.

** Rating based upon water at 170°F in radiators.



PETRO COMPLETE "PACKAGED UNIT" Consisting of Burner (for oil or gas or both), Fuel System, Control Panel, and Pre-formed Refractory Combustion Throat.

This Petro package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated — a thoroughly engineered firing plant. Includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler-front and making service connections for power and fuel. This represents a substantial saving in installation time and cost — but even more important it means a factory tested and assembled unit for high operating efficiency and fuel savings.

Control panel is totally enclosed with all instruments wired and tested at factory.

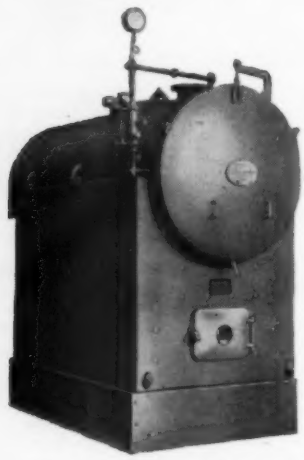
The units are designed for easy application to all types of boilers including the Scotch Marine. They operate either under normal firebox draft conditions or under positive pressure in sealed firebox boilers which are designed for operation under furnace pressure.

TITUSVILLE IRON WORKS

Division of Struthers Wells Corporation

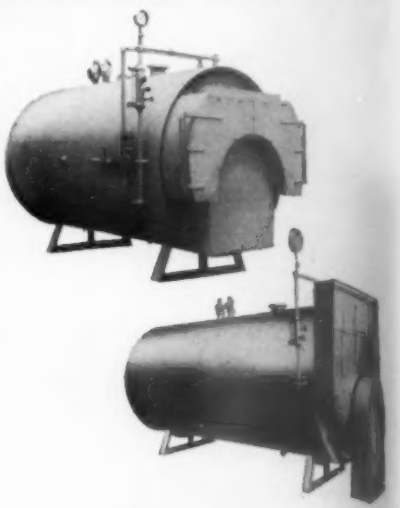
Titusville, Pennsylvania

Manufacturers of Dependable Boilers Since 1860



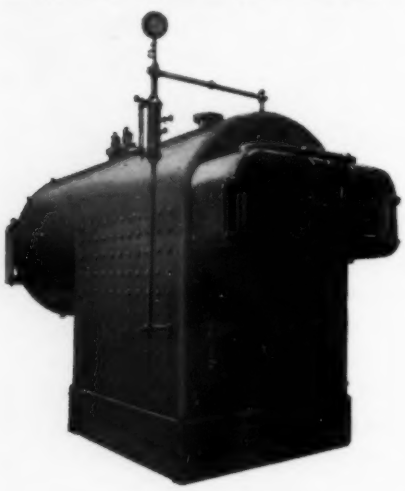
TITUSVILLE COMPACT STEEL HEATING BOILERS

This all-steel heating boiler is compact in design, requiring less boiler room floor space than any other type, and is ideal for school heating. Excellent operating economies are obtainable, due to the unit's modern 3-pass construction feature. Titusville Compact Boilers are built for use with all fuels and all types of firing—ample combustion space is provided to economically burn oil, gas, or coal. These boilers are manufactured in 19 different sizes, all rated in accordance with latest rating code of The Steel Boiler Institute. They are constructed using ASME code rules. Each boiler is factory inspected and tested by Hartford. Bulletin No. B-3000-B.



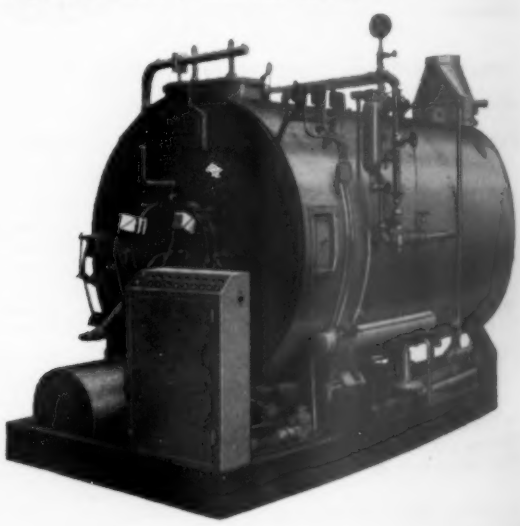
TITUSVILLE SCOTCH MARINE BOILERS

The famous Titusville Scotch Marine Boilers are a specialty of this company. As the largest builder of Scotch Marine Boilers, Titusville has developed this type to be the last word in economy and durability for both power and heating purposes. The Type SPO (Bulletin B-3075-A) and Wee Scot (Bulletin B-3050-A) are of all-welded construction, with large combustion chambers assuring unusual quick steaming and high efficiency, and strong cylindrical design assuring long life and ease of cleaning. Both provide a volume of 1½ cu. ft. per 10 sq. ft. of heating surface. The Type SOH Wet Back Top Heating Boiler (Bulletin 5135-C) features low water line and low head room, and is available in 19 sizes. Outstanding advantages include extra large steam volume and disengaging area. Like the Type SPO boilers the Type SOH require no pit or brick base for installation.



TITUSVILLE ALL-WELDED FIREBOX BOILERS

The Titusville WP Type Firebox Boilers are all-welded, utilizing advanced welding methods, quality steels and modern fabricating techniques. A streamlined boiler of exceptional strength, the Type WP has no riveted seams or screwed stays, and remains tight under all operating conditions. A self-cleaning crown sheet and ample clean-out facilities are included in the design. These boilers combine high efficiency and low maintenance in service, and are readily adaptable for burning all sizes of bituminous and anthracite coal, or, in the WPO Model, for using any recognized oil, gas or combination gas-oil burners. Bulletin No. B-3030.

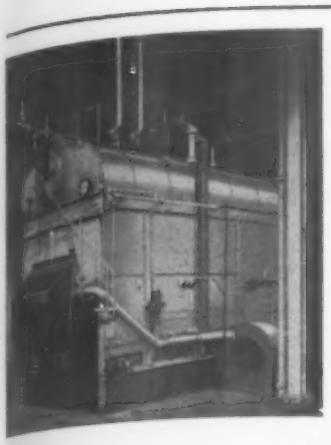


TITUSVILLE TICOSTEAM GENERATOR

A Package Steam Generator

This Titusville Package Steam Power Plant is founded upon the experience of 90 years of Titusville boiler manufacture. Before producing the Ticosteam Generator, many installations of existing steam generators were thoroughly evaluated to be sure of achieving a definitely superior Titusville product. The Ticosteam Generator is furnished complete and ready to operate when connected to the necessary facilities. It is factory finished, factory tested, factory certified, and is equipped with safety features that are outstanding in the field. These units are available in various sizes, from 690 to 12,075 lbs. of steam per hour and are designed for operation on light oil and combination light oil and gas—heavy oil and combination heavy oil and gas—and straight gas. Conservative ratings assure a thermal efficiency of 80% when fired with oil or gas. Bulletin B-3100.

TITUSVILLE IRON WORKS



TITUSVILLE TICOTHERM STEAM GENERATORS

These large, highly efficient water tube steam generators are economical in operation and compact in design. They are constructed to meet or exceed a safety factor of 5, and drums are fusion welded, X-ray tested and stress relieved to meet or exceed ASME requirements as well as all local and state codes. Excellent results are achieved with any type of fuel. Ticotherm Steam Generators are completely insulated—top, sides and rear—with a minimum of 7 inches of refractory and insulation at side walls; boilers are completely steel encased. Four passes of gas travel are provided by vertical baffling, resulting in a minimum of draft loss and maximum heat absorption. Soot blowers are furnished as standard equipment on all boilers except gas-fired models. Bulletin B-3250-A.

TITUSVILLE 3-DRUM WATER TUBE BOILERS

Titusville Type TDL Welded Low Head Water Tube Boilers are built in many standard sizes to meet specific school heat and power requirements. These boilers are the "work horses" of the boiler industry. Outstanding features include larger all-welded drums permitting a higher ratio of water in the boiler to horsepower output; all boilers X-ray tested and stress relieved to meet or exceed ASME, state and local codes; an absolute safety factor of 5 or more; low head design, saving head room; efficient operation on any type of fuel. Bulletin B-3200-A.



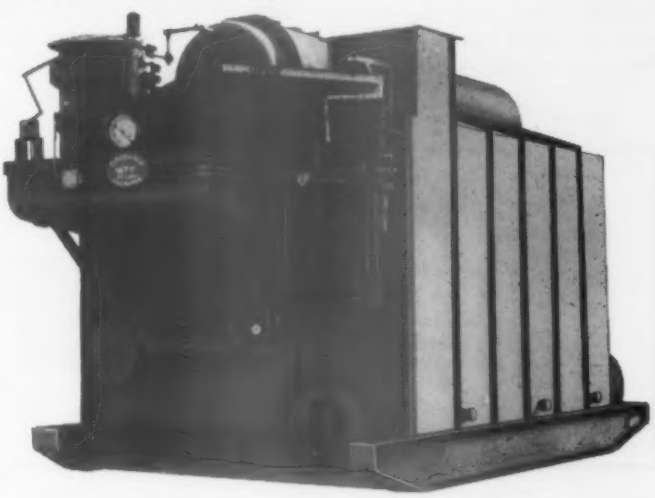


TITUSVILLE 4-DRUM WATER TUBE BOILERS

Titusville Type W Welded 4-Drum Water Tube Boilers may be fired with coal, oil or gas fuels and provide outstanding continuous daily performance of high efficiency—due to proper proportioning of drum and tube areas, natural circulation and scientific baffling. These boilers will produce dry steam at a minimum of cost and with a maximum span of life. Records maintained over many years demonstrate a consistently low average steam cost with these Type W Boilers, proving high efficiency that is unimpaired by time and varying load conditions. Many items of standard equipment are included, with special equipment available to meet any specific school installation requirement. Bulletin 3225-A.

TITUSVILLE WTP PACKAGE WATER TUBE BOILER

This compact, shop-assembled water-tube steam generator features simplicity and economy of operation, and is shipped as a package complete with firing equipment, controls and all other components installed ready for service connections in the field. Enclosed and protected by all-welded, pressure-tight steel casing, the unit is easy to move by lifting or skidding, and erection costs are reduced to a very low minimum. Forced draft, pressurized furnace operation eliminates need for stack or induced draft fan. The Titusville WTP Steam Generator is designed to use heavy oil; heavy oil and gas combination; light oil; light oil and gas combination; natural gas; manufactured gas; coke oven gas. Construction is in accordance with latest code requirements. Fully automatic welding is employed, welds are X-rayed, and drums stress-relieved. All operations are inspected by resident Hartford steam boiler inspector. Bulletin WTP.

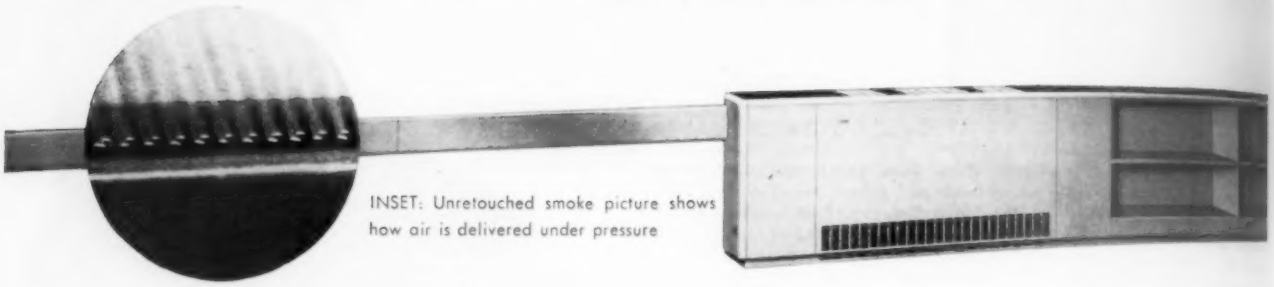


Write for the respective descriptive bulletins on the boilers in which you are interested — and let us arrange to have our nearest representative call at your convenience to consult on your school heating or power boiler requirements — without obligation of any kind.

THE TRANE COMPANY

La Crosse, Wisconsin

NEW TRANE UNIT VENTILATOR SYSTEM stops cold downdrafts before they start



INSET: Unretouched smoke picture shows how air is delivered under pressure

Blankets entire window area with tempered ventilation . . . delivered under pressure even when the heat is off!

NOW FOR THE FIRST TIME, school children . . . and teachers too . . . can receive fresh, properly warmed air which is distributed uniformly along the entire window wall *blocking downdrafts every minute of the day.*

No other unit ventilator ever built can blanket the entire outside wall with a forced upward flow of tempered air, providing better heat and air distribution . . . and protecting pupils from cold downdrafts, even when the heat is off.

Architects, engineers, school boards and manufacturers have long agreed that the ideal unit ventilator would blanket large window areas with a continuous, forced stream of tempered air. Now TRANE engineers have actually found the answer—the new TRANE Unit Ventilator System.

Here's how it works: Fresh outdoor air and recirculating room air are drawn into the unit ventilator in the desired proportions. This air is filtered, heated to the proper temperature, blended . . . and distributed in two ways: (1) part of it is moved through grilles at top of unit, (2) part of it is forced out through ducts which are scientifically designed and perforated along the top to distribute air uniformly along the wall. Special centrifugal fans keep this air under pressure . . . constantly forcing it upward over the window-wall, even when the thermostat calls for no heat.

CHOOSE FROM THE NATION'S MOST COMPLETE LINE OF



VOLUME VENTILATORS
For auditoriums, gymnasiums and other large spaces requiring tempered ventilation. Floor, wall and ceiling types.



"Code-Rated" CONVECTORS
Available in sloping-top, flat-top, wall-hung, recessed, semi-recessed, free-standing models . . . hundreds of sizes and combinations.



FORCE-FLO HEATERS
Attractive blower-type units for heating entryways, lobbies and large areas. Available in a variety of models.

THE TRANE COMPANY

THE TRANE COMPANY



HEAT ISN'T NEEDED most of the time in occupied classroom . . . but *ventilation* is! So even when the heat's off, this Trane system gives *constant*, upward moving ventilation which blocks downdrafts.

HEATS MORE EVENLY . . . ends cold corners

VENTILATES MORE UNIFORMLY . . . ends stale spots

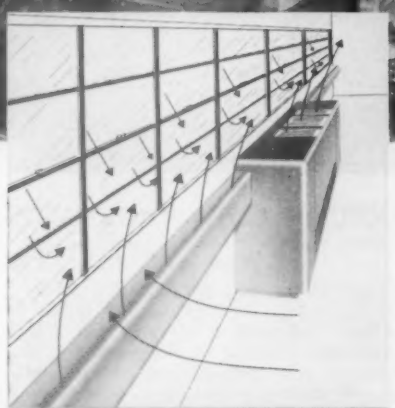
STOPS DOWNDRAFTS CONSTANTLY . . . ends window chill

Most occupied classrooms require constant ventilation plus a slight amount of cooling to offset occupant heat gains. The Trane System actually blocks drafts during this cooling period by providing a continuous flow of upward moving tempered air.

These extra sturdy units are built to withstand abuse and stay attractive. They can be painted to blend with any color scheme. Their corners are rounded for safety and appearance. Their base is recessed to eliminate unsightly mars and scuff marks.

Matched shelving with a built-in duct is optional. You can choose standard units in either open or closed shelving. Matching convectors also available to speed early morning warm-up.

For more details, contact your TRANE sales office, or write TRANE, La Crosse, Wisconsin.



Chilling downdrafts are reversed and blended with tempered ventilation air.



Optional shelving available with built-in duct.

Standard motor drives quiet, centrifugal fans.



Three-section front panel makes inspection easy.

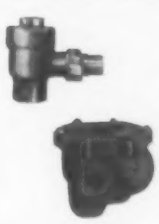
Famous Trane coil provides maximum heat transfer.

HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT



HORIZONTAL HEATERS

For heating hard-to-reach areas and blanketing walls, windows and doorways. Many models and capacities.



HEATING SPECIALTIES

A complete line of fittings —valves, traps, strainers and vents, for steam or hot water systems.



PROJECTION HEATERS

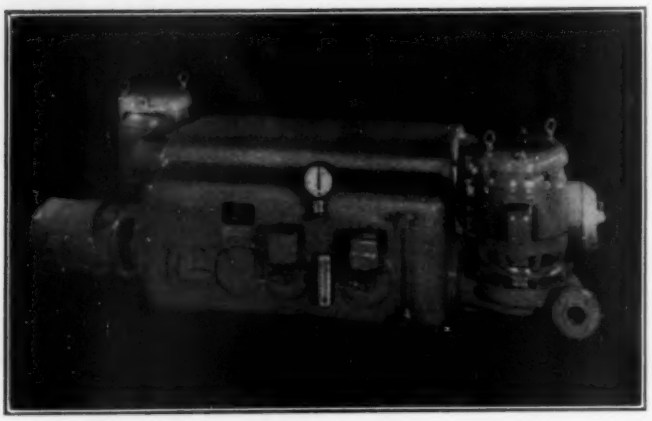
Salvage heat otherwise lost at ceiling . . . project it downward to occupancy zone. Ideal for gymnasiums and auditoriums.

LA CROSSE, WISCONSIN

THE NASH ENGINEERING COMPANY

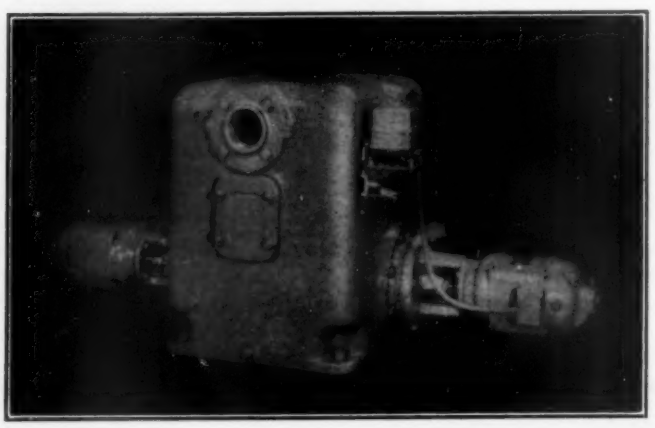
222 Wilson Road, South Norwalk, Conn., U.S.A.

SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES



RETURN LINE VACUUM HEATING PUMP
UNIT TYPE

Removes air and condensation from return lines of vacuum heating systems. Separation of liquid and gas is made under vacuum. Independent air and water units, combined in single casing and rotating on single shaft, handle returns with high efficiency. Air unit delivers to atmosphere without back pressure. Water unit delivers directly to boiler. Bronze fitted throughout. No internal wearing parts. No internal lubrication. Supplied direct connected to electric motor, or for belt drive, for continuous operation or with automatic control. Standard capacities up to 40,000 sq ft equivalent direct radiation. Larger units special. *Bulletin on request.*



JENNINGS VAPOR TURBINE VACUUM HEATING PUMPS

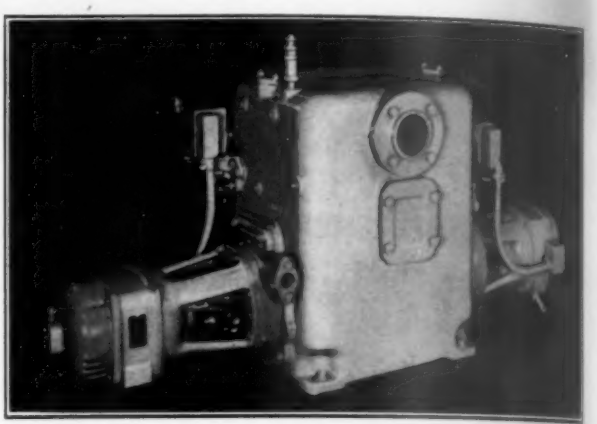
The Vapor Turbine combines all the advantages of our standard return line heating pumps with a new type of drive, a specially designed low pressure turbine which operates on any system, on steam directly from the heating mains, eliminating electric motor. Requires a differential of only 5 in. of mercury, and returns steam used to the heating system immediately, with little heat loss. This pump affords the safety and economy which goes with a continuous condensation return and steady vacuum, and at no cost for electric current. Up to 150,000 sq ft equivalent direct radiation. Larger sizes built special. *Bulletin on request.*

RETURN LINE VACUUM HEATING PUMP
TYPE CSM

The new CSM Heating Pump achieves a high level of performance and efficiency. Complete flexibility is secured in this design, since each pumping element is driven by its own motor, actuated by its own control.

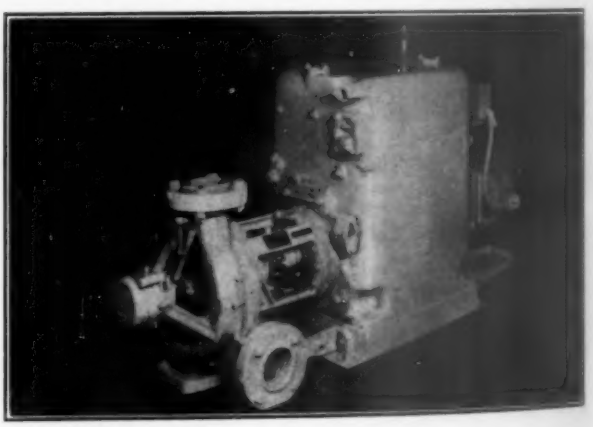
This makes possible a wide range of air and water capacities that can be selected to meet the exact requirements of each particular job.

These pumps are now available in a full range of air and water capacity combinations, for operation up to 20 inches Hg vacuum, and for pressures from 10 lbs to 70 lbs. *Bulletin on request.*



CONDENSATION PUMP

Removes the condensation from radiators in return line steam heating systems, particularly radiators set below the boiler water line level, and pumps the condensation back to the boiler. Pump is bronze fitted with enclosed centrifugal impeller of improved design. By making the pump casing a part of the return tank, and bolting the motor base to the tank, floor space is conserved. The rectangular construction permits installation in a corner against the wall. Supplied in standard sizes with capacities ranging from 1½ to 225 gpm of water. For serving up to 150,000 sq ft of equivalent direct radiation. *Bulletin on request.*

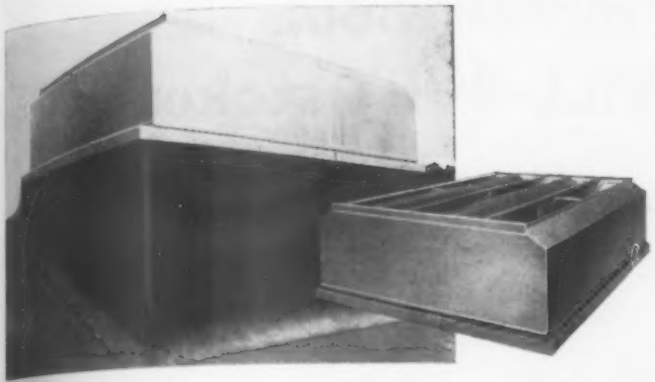


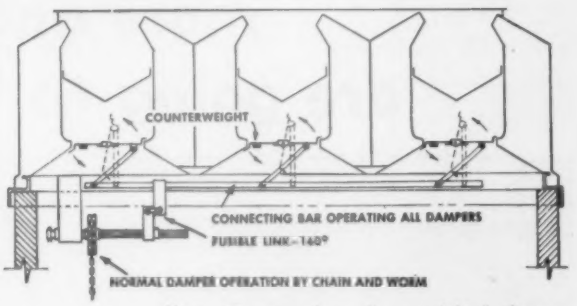
THE SWARTWOUT COMPANY

18527 Euclid Avenue Cleveland 12, Ohio, U. S. A.

Representatives In All Principal Cities

This low contour AIRMOVER supplies ideal normal and safety Stage Ventilation





Above diagram shows how weighted dampers open simultaneously when heat melts fusible link.

Airmover is a highly efficient roof ventilator of unique design which is particularly suitable for public buildings such as schools, auditoriums, gymnasiums, etc. Its low overall height makes it unobtrusive. It can usually be hidden from ground level view. A series of parallel 12 inch "heat valves," built into units 10′ 0″ wide by 7′ 6″ long, provide 90 square feet of opening per unit. Any number of units can be erected in a continuous run, according to need.

Because of Airmover's low height—32″—air travel is short, and air friction is reduced to a minimum. The ventilator is weatherproof at all times; ample drainage is provided. Efficient dampers, operated in unison, can be adjusted to any opening desired.

For normal ventilation purposes, manual or mechanical operation of the dampers can be arranged. As a fire hazard safety device, release of damper operating bar by the melting of an approved type of 160° fusible link permits weighted dampers to open wide when fire occurs. Heat and smoke pass rapidly through the Airmover, which meets the requirements of the National Board of Fire Underwriters. Write for full data.

The efficient, silent AIRLIFT for duct exhaust

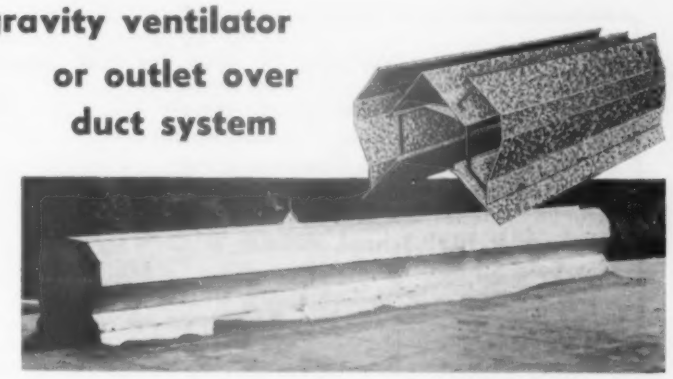




Utilizing low fan tip speeds and backwardly curved blades in a highly efficient centrifugal type fan, Airlift achieves the desired low-noise-level operation for duct exhaust on public buildings. A number of important design and structural features are fully covered in our bulletin on the Airlift. Most important are the close coupling of fan and throat, and oversize exhaust area which permits a lower curb. The entire assembly insures positive exhaust with a minimum of friction and turbulence, and unusually quiet operation. Airlift's higher efficiency often permits use of smaller size units than ordinarily specified in other centrifugal ventilators. Airlift is made in 14 sizes with 49 capacity variations. Airlift Jr. serves to exhaust from smaller areas—is made in 2 sizes with 4 capacity variations. Write for full description of the Airlift and Airlift Jr.

HEAT VALVE — ridge and flat roof gravity ventilator or outlet over duct system

For peak roofs or sawtooth construction, the Swartwout-Dexter Heat Valve has no equal as a continuous, weatherproof vent. It has been proved on thousands of feet of industrial, commercial and military roofs. Heat Valve is frequently used on school buildings in even shorter sections than the example shown at right, on flat roofs over outlets of duct systems exhausting corridors and other spaces. This is the original "Heat Valve" type ventilator, improved over the basic Dexter design. Air-travel is short—almost frictionless. Heat Valve's low overall height is important architecturally, also. Exterior shape guides outside air currents to create additional capacity through suction effect. Efficient damper easily operated for any position from tight closed to full open. Write for descriptive bulletin on the Heat Valve.



THE WILL-BURT COMPANY

Orrville, Ohio

STOKERS • RESIDENTIAL BOILERS • OIL AND GAS CONVERSION BURNERS

more and more schools are going to WILL-BURT stokers





You'll find schools all over the country using Will-Burt bituminous stokers. They've found it *pays*. Less fuel—less service. And you're sure of a Will-Burt stoker lasting for years. Many have been in service for 10 years or more and are still giving complete heating satisfaction. School executives have proved they like Will-Burt by succeeding purchases as their expanding school system required.

Exclusive Will-Burt patented features, important to the best stoker installation, include automatic air control, shear pin switch, coal metering block and coal screw locking device. Either bin-feed or hopper-feed models are available.

Write, wire or phone the factory for complete information.

LISTED BELOW ARE A FEW OF THE MANY SCHOOLS USING WILL-BURT STOKERS

Alexander School, Springfield, Illinois
Monmount High School, Decatur, Indiana
Glidden High School, Glidden, Iowa
St. Martin & St. Michael School, Louisville, Ky.
Our Lady of Sorrow School, Farmington, Michigan
Hickory Jr. High School, Hickory, N. C.
Garfield School, Youngstown, Ohio
Heyl Avenue School, Columbus, Ohio
Roxboro Jr. High School, Cleveland Heights, Ohio
East Donegal Twp. High School, Maytown, Pa.
Spartanburg High School, Spartanburg, S. C.
Park Jr. High School, Knoxville, Tenn.
Woodrow Wilson School, Danville, Va.
B. F. Day High School, Seattle, Wash.
Bridge Street School, Wheeling, W. Va.
Garfield School, West Allis, Wisconsin

MORSE BOULGER DESTRUCTOR CO.

205-U East 42nd Street, New York 17, N. Y.

AGENTS IN PRINCIPAL CITIES

PRODUCTS

Incinerators of all types for the destruction of garbage and rubbish, and anatomical wastes from infirmaries or laboratories, in combination or separately. General types are Cell and Hearth for General Medium and Heavy Duty Service (Morse Boulger); Flue-Fed for Multiple Floor Service in Buildings (Kernerator); Ready-Built (Bricked-in or Portable) for Basement Service in Buildings (Kernerator).

Send for literature. Ask for Bulletin No. 180.

MORSE BOULGER INCINERATION

All authorities agree that the complete destruction by incineration of trash before it accumulates is the best way to safeguard school buildings from fire. They also agree that the incineration of garbage and anatomical wastes from kitchens, laboratories and infirmaries is the surest way to destroy any disease carrying elements and to eliminate flies and odors. The design of Morse Boulger Incinerators is such as to provide complete destruction of all combustible products. Hundreds of schools and colleges have Morse Boulger Incinerators.

ENGINEERING SERVICE

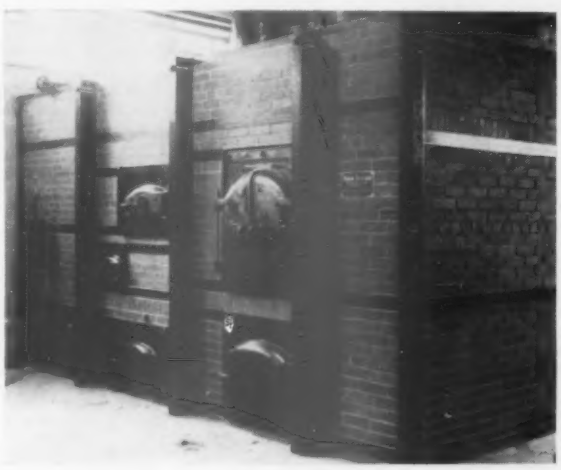
We can offer school authorities sixty years of the broadest experience in the field of incineration, including problems peculiar to schools, colleges and institutions. Our engineers will be glad to discuss your problems with you or your architect-engineer and recommend the best type of incineration to take care of your school's requirements. Keep in mind it is usually practicable to handle both wet and dry wastes in the same incinerator provided it is designed properly for such combination service. Morse Boulger Incinerators may be arranged for oil, gas, coal or wood firing or, where dry trash only is handled, will often operate without fuel.

GUARANTEE

Morse Boulger Incinerators are guaranteed as to correctness of design, materials, workmanship and performance. Morse Boulger Destructors are installed by our own skilled field crews.

MORSE BOULGER INCINERATORS

TYPE A . . . This incinerator, being a general utility unit where proportions of rubbish and garbage may vary widely, is probably the best of our several types for handling school destructible wastes. It will usually handle without auxiliary fuel any combination of dry rubbish and wet garbage up to 50% garbage content. Wet garbage up to 60% of rated capacity can be burned with oil, gas, coal or wood as the fuel. The incinerator can be located in the basement or housed in a separate small building.



The Type A Morse Boulger Incinerator comes in 6 different standard sizes, with capacities (based on dry rubbish) ranging from 125 to 900 pounds per hour. Larger sizes are available. If the Type A Incinerator will not take care of your problem, we have numerous other types of incinerators each best for handling certain kinds of wastes.

KERNERATORS

Where incineration requirements call for multiple floor service, as in a school infirmary for example, the Flue-Fed Kernerator would probably be best. As many floors as desired can be accommodated, each floor having its own hopper door in a common chute which leads to the incinerator in the basement. If the material is not self-combustible, as with dry trash and rubbish, arrangements can be made to fire the unit with gas, wood or coal.

Another Kernerator finding wide use in small buildings such as dormitories, etc., is the Ready-Built Type. This comes either "bricked-in" and connected directly to the furnace chimney or the "portable" type which is set anywhere on the basement floor and connected to the chimney by ordinary furnace piping. Both types are gas fired when the material destroyed is not self-combustible.

CRANE CO.

GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO 5 • NATION-WIDE DISTRIBUTION THROUGH BRANCHES, WHOLESALERS, PLUMBING AND HEATING DEALERS

CRANE FIXTURES

part of sound school and university planning

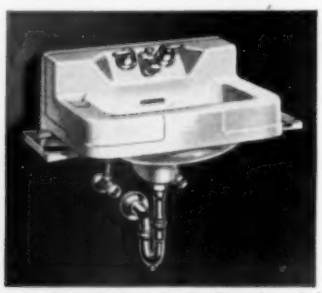
Schools and universities do their planning from the long-range point of view. They know that generations of students will come and go—while school facilities must go on and on, year in and year out, with a minimum of maintenance.

That's why, when you build for permanence, you do well to consider Crane plumbing. Experience in schools across the country has shown that Crane is not only the *preferred* plumbing... it's the plumbing that means *permanence.*

Typical of the complete line of Crane equipment for schools and universities are the items shown here. Check them over whether your modernization plans call for remodeling or new construction. Then let your Architect or Plumbing Contractor know your preference for Crane.



Rhodile Lavatory 1-510-W. Long wearing cast iron enameled lavatory. 6" high back for wall protection. Spacious rectangular basin with soap depression. Chromium plated Vantage Dial-ese controls. Direct lift waste. Size: 20" x 18".



Oxford Lavatory 1-135-E. Smartly styled of durable vitreous china. 3¼" high shelf back. Rectangular basin with splash lip and soap depression. Chromium plated Whitney Dial-ese controls and direct lift waste. Sizes: 19" x 17", 20" x 14".



Norwich Lavatory 1-220-S. Functionally styled for practical service. Vitreous china lavatory on pedestal leg. 6" high back. Spacious rectangular basin with splash lip and soap depression. Easy action, chromium plated Embassy Dial-ese controls provide positive water control. Indirect lift waste. Sizes: 20" x 18", 24" x 21".



Walton Closet 3-450. Efficient Siphon jet closet with Sani-Black hard rubber open front seat with check hinge. Elongated rim, top spud bowl. Manually operated flush valve. Also available with back spud and concealed flush valve.



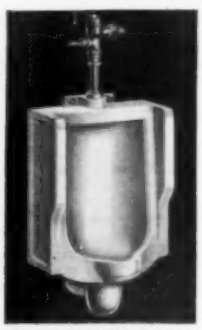
Santon Closet 3-300. Easy-to-clean closet with Sani-Black hard rubber open front seat with check hinge. Siphon jet elongated rim. Top spud bowl. Manually operated flush valve. Also available in Santon Jr. model. 13½" junior height.



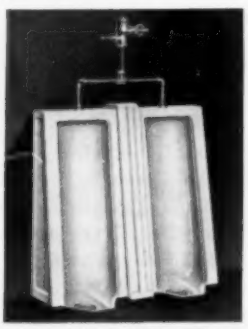
Sanuro Urinal 7-96. Siphon jet pedestal urinal of vitreous china. Simple design and rounded contours promotes cleanliness and sanitation. Royal exposed flush valve.



Oxford Closet 3-140. Modern, close-coupled closet made of gleaming vitreous china. Efficient whirlpool action bowl with self-draining jet. White plastic closed front seat and cover.

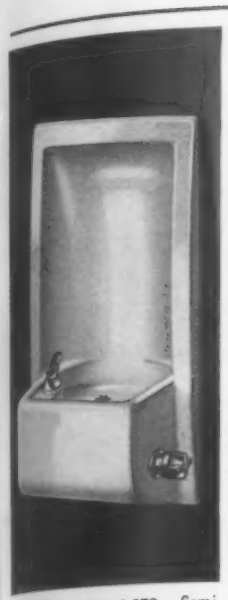


Neu-Rio Urinal 7-80. Space saver vitreous china blowout urinal with integral extended shields, flushing rim and trap. Receding concave back to minimize splashing.



Sanitor Urinal 7-34. Vitreous china slope top inlet stall urinal with integral flushing rim. Furnished singly or in batteries of two or three urinals with one flush valve. Vitreous china seam covers.

CRANE CO.



Coolbrook Fountain 6-570. Semi-recessed space saving drinking fountain of vitreous china. Elevated bubbler base to safeguard against back siphonage. Integral strainer. Purflo angle stream bubbler. Victor Magiclose control valve. Width 15". Height 26½". Projection 7¼".



Corwith Fountain 6-504. An attractive pedestal type drinking fountain of gleaming vitreous china that will provide years of service. Has sanitary Purflo angle stream bubbler with automatic stream regulator, and Victor Magiclose self-closing valve. Size: 12½" x 12½" x 34" high.



Wal-Pak Water Cooling Unit. Fits inside wall. Also installable in nearby closet or basement. Two sizes for supplying one or two fountains. Can supply fountain on adjoining floor. Tamper-proof, noiseless, costs no more than exposed coolers. Can be used with any Crane drinking fountain.





Clearstream Fountain 6-515. Small modern designed vitreous china drinking fountain with integral strainer. Bubbler base located above receptor rim as safeguard against back siphonage. Purflo angle stream bubbler. Victor Magiclose self-closing valve. Width 12". Projection 13".

Efficient additions to your Home Ec Department



Sanyday Sink 5-50-S. Single basin, acid-resisting porcelain enameled cast iron sink. Depressed drainboards, soap depressions, chromium plated Temple Dial-ese controls, retractable hose with thumb action spray. Receptol basket strainer waste. White baked enameled steel cabinets provide roomy storage space. Sizes: 54" and 60" x 25¼".



Stewardess Sink 5-103-S. Compact, single basin, single drainboard, acid-resisting, porcelain enameled cast iron sink. Chromium plated Embassy Dial-ese control. Receptol basket strainer waste. Baked enameled steel cabinets. Size: 42" x 22½". For right hand drainboard, specify 5-106-S.



Sink 5-131-S. For continuous counter installation. Acid-resisting, porcelain enameled, cast iron. Two-compartment flat rim sink with extended back ledge. Chromium plated Embassy Dial-ese controls with thumb control spray and retractable hose. Receptol basket strainer waste. Size: 32" x 21".

Crane products are readily available through Crane Branches, Crane Wholesalers, and local Plumbing Contractors in every community.

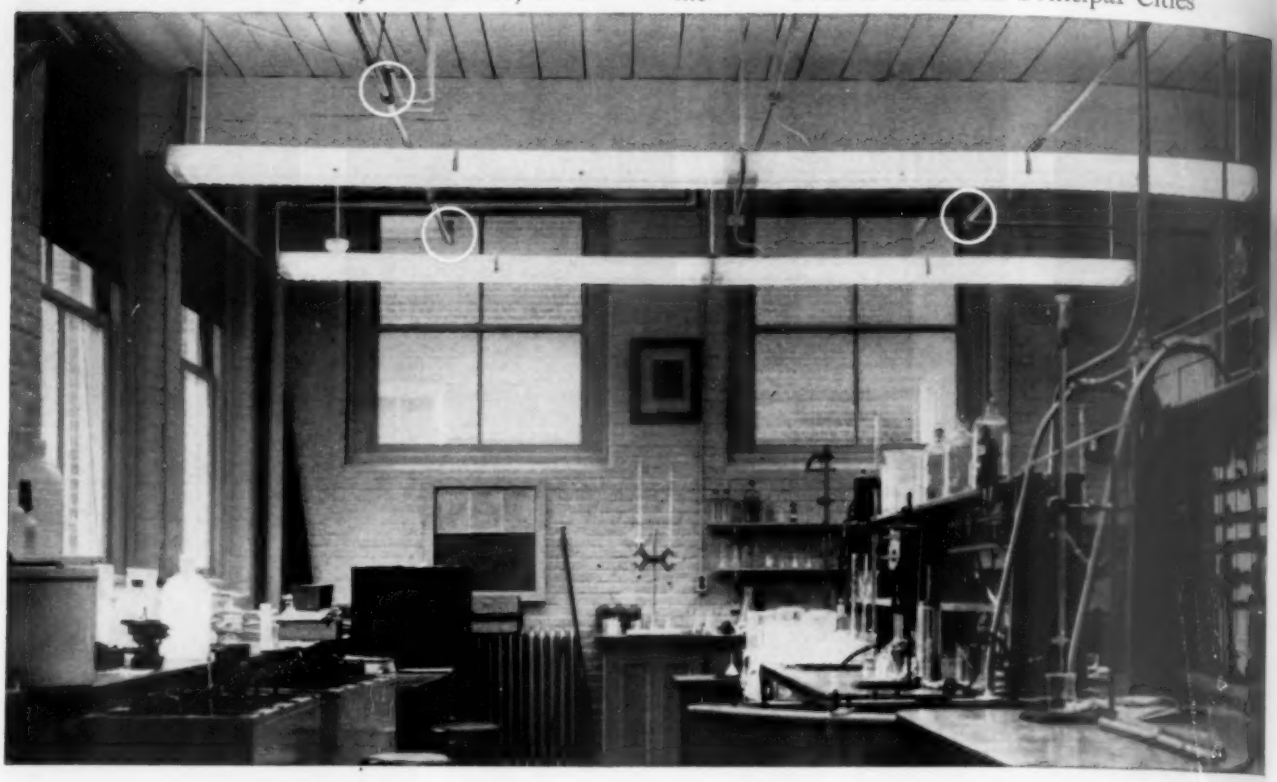
CRANE CO.

GENERAL OFFICES: 836 SOUTH MICHIGAN AVE., CHICAGO 5

VALVES • FITTINGS • PIPE
PLUMBING AND HEATING

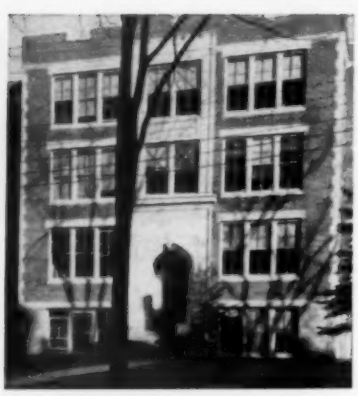
GRINNELL COMPANY

Executive Offices, Providence, R. I. — Branch Offices in Principal Cities



No Experimenting In This Lab

when it comes to fire safety!



Laboratory in Aubert Hall at University of Maine. Although not of fireproof construction, Grinnell Sprinklers make this lab *fire safe*.

Laboratory classrooms are a frequent starting place for the estimated seven school fires that occur every single day. For it's here that students experiment. And as long as opportunity for human error or carelessness exists, so will the threat of destructive fires.

But damage from fire can be greatly limited. Fires that break out in schools, for example, *can be* stopped, whenever and wherever they start, day or night, by a Grinnell Automatic Sprinkler System. Seventy-six years experience proves this.

And now, with the new Grinnell Automatic *Spray* Sprinklers, even greater fire protection is afforded. Less water puts out more fire!

See that Grinnell Sprinkler Heads are on guard in your school

There is a moral obligation on the part of those in charge of schools and universities to provide the utmost protection of life and property. So, for your own sake, be sure that the lives and property for which you are responsible are protected with a Grinnell Automatic Sprinkler System — your assurance of safe, dependable fire protection. Grinnell Company, Inc., 271 West Exchange St., Providence, R. I. Branch offices in Principal Cities.

GRINNELL

PROTECTION AGAINST EVERY FIRE HAZARD

Manufacturing, Engineering and Installation of Automatic Sprinklers Since 1878

Bradley ANNOUNCES VANDAL-PROOF FEATURES

Realizing that school and institutional washroom facilities sometimes are subjected to extremely severe use, Bradley now offers the following special Washfountain features as standard equipment.



All of these vandal-proof features are furnished without extra charge.

LOCKING TIE ROD ASSEMBLY

All unvented Washfountains are equipped with special tamper-proof cap nuts and coupling nuts.

LOCKING SOAP DISPENSER FILLER CAPS

Soap Dispensers are provided with locking Filler Caps which prevent mischievous meddling with contents.

MIXING VALVE STEM WITHIN PEDESTAL

Washfountains having supply lines from below are furnished with short stemmed Mixing Valves completely concealed within pedestals, thereby making it impossible to interfere with water temperature setting.

METAL PEDESTALS

All Washfountains for schools and institutions are furnished with metal pedestals unless otherwise specified by purchasers. As illustrated, the removable panels afford maximum accessibility to interior mechanism but when in place effectively restrain tampering with valves and fittings within.

Additional Specifications

SPECIAL SCHOOL and INSTITUTIONAL FIXTURES

Bradley WASHFOUNTAINS



All Bradley Washfountains are suitable for main washrooms, the type selected being determined by the space available and the number of users to be served.

OUTSTANDING ADVANTAGES

LOW-COST INSTALLATION — Washfountains require only the same 3 plumbing connections needed for each single-person lavatory, thus greatly reduce installation expense.

MAXIMUM SANITATION — Each Washfountain user washes in running water, assuring the utmost in sanitation.

LOW MAINTENANCE COSTS — Washfountains are quickly cleaned, economically maintained because one Bradley replaces as many as 8 to 10 basins.

SPACE SAVING — Bradleys save an average of 25% in floor area, release valuable space for other equipment.

BRADLEY WASHFOUNTAINS are available in hand and foot controlled models, in circular and semi-circular designs, and in 54" and 36" diameter sizes accommodating 3, 5-6, or 8-10 users simultaneously.

MATERIALS — Bradley Washfountain bowls may be had in a wide range of beautiful, durable Precast Marble, Precast Stone, Enameled Iron and Stainless Steel. Pedestals for school and institution fountains are constructed of heavy gauge bonderized steel with panels enameled to harmonize with bowls. Scuff bases are black.

JUVENILE HEIGHT — Special low-height Washfountains for the use of small children are available on special order at no extra charge.

THERMOSTATIC MIXERS — Thermostatic mixers preset at a comfortable washing temperature are available and recommended where fluctuating pressures make temperature changes difficult to control with manually operated mixing valves. Prices on request.



For installation in cafeterias and in corridors adjacent thereto, Bradley semi-circular fixtures are recommended.



BRADLEY DUO WASHFOUNTAINS

The 2-person Bradley Duo is especially popular for use in classrooms, labs, and other special applications in schools and institutions, as well as in washrooms of all kinds. Duos are available with bowls of Enameled Iron (white or green) or Stainless Steel.



and MULTI STALL SHOWERS

MULTI-STALL SHOWERS — Bradley circular and semi-circular Multi-Stall Showers accommodate 5 and 3 users respectively. They are available with or without precast stone receptors.

MATERIALS AND EQUIPMENT — All steel and iron shower parts are bonderized to prevent corrosion and are finished in gray high temperature baked enamel. Standard equipment includes curtains, operating valves, soap trays and vandal-proof showerheads.

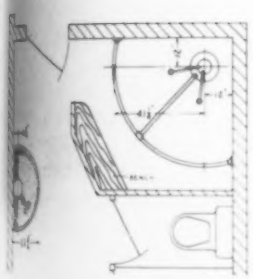
SPECIAL EQUIPMENT — Lower or higher shower head heights are available. Bradley Showers also available with single supply for cold or tempered water with one operating valve per shower head. Prices on request.



Type AMR Shower — Circular, 5-person, with receptors. Supplies from below. Vented off drain.

BRADLEY COLUMN SHOWER
When desired all types and sizes of Bradley Showers can be furnished less partitions, structural frame-work and curtains. The assembly then consists of drain fitting, central column with spray-heads, soap trays, control valves and mixing chamber. Popular for team shower rooms as they provide all the advantages of gang showers, plus lower installation cost.





New Bradley Corner Shower

Bradley 2-person Corner Showers provide extra shower capacity by utilizing wasted corner space. They are available with 1 or 3 partitions, with or without precast stone receptors, or as Column Showers.

EXCLUSIVE BRADLEY ADVANTAGES

CONSTANT TEMPERATURE — Bradley Showers prevent both the unpleasant shock of sudden chilling and the danger of scalding.

ADJUSTMENT — The mixing valve in Bradley hand-controlled showers makes it possible to adjust water temperatures at any pressure.

CLEANLINESS — Maximum sanitation and minimum janitor labor are assured by the complete absence of corners and dirt-collecting pockets.

RECEPTORS — When equipped with receptors, Bradley Showers are completely self-contained, can be installed on any floor — including wood.



BRADLEY SOAP DISPENSERS

Bradley liquid and powdered soap dispensers are attractively designed units. They are easy to operate, having large capacity. Two-inch openings with locking type filler hole caps make filling easy. Soap valves are metal.

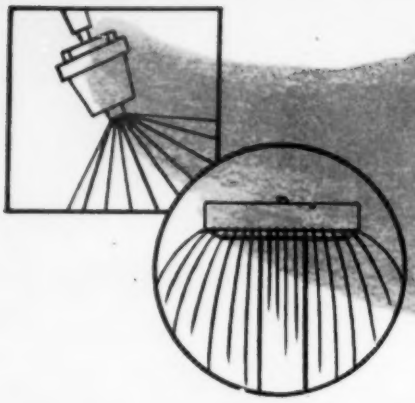
Bradley

WASHFOUNTAIN CO.

NORTH 22nd AND WEST MICHIGAN STREETS

MILWAUKEE 1, WISCONSIN

SPECIAL SCHOOL and INSTITUTIONAL FIXTURES



Among the thousands of Bradley users in schools, colleges, hospitals and institutions the following are typical:



Bradley 36" dia. stainless Washfountain in use at John Greene School, Warwick, R. I.



Stairwell area used for fountain near entrance to cafeteria, Central High School, Minneapolis.



Nine boys using a 54" dia. Washfountain at St. Joseph Technical High School, Cleveland Ohio.



Elementary school installation Bradley Duo Washfountain tague, Mass.

SCHOOLS and COLLEGES

Culver City H. S., Birmingham, Ala.
St. John's School, Healdsburg, Calif.
Tech. Voc. H. S., Hammond, Ind.
Onarga Military School, Onarga, Ill.
University of Delaware, Dover, Del.
Chatham Elem. School, Chatham, Mass.
Hadley Voc. School, St. Louis, Mo.
Wayne University, Detroit, Mich.
Joint Negro H.S., Charlottesville, Va.
Rockland School Gym, Rockland, Ida.
Westminster G. S., Westminster, Md.
Texas Tech. College, Lubbock, Tex.
Franklin Pierce School, Parkland, Wash.
Senior High School, Amarillo, Texas
St. Cecilia's School, Portland, Oregon
Public School No. 38, Buffalo, N. Y.
Phalen Park School, St. Paul, Minn.
Medford High School, Medford, Mass.
Spencer High School, Spencer, Iowa
Key West High School, Key West, Fla.
Greeley Public School, Greeley, Colo.
Holy Name School, New Orleans, La.
Henry Woods School, Indianapolis, Ind.
Primary School, East Hartford, Conn.
High School, Ypsilanti, Mich.
Bangor Elementary School, Bangor, Me.
Grand Island H.S., Grand Island, Neb.
Parma Senior High, Cleveland, Ohio
University of Rhode Island, Kingston, R.I.
Oregon State College, Corvallis, Ore.
Rockland School Gym., Rockland, Ida.

INSTITUTIONS and HOSPITALS

Illinois State Penitentiary, Pontiac, Ill.
St. Joseph Hospital, Fort Wayne, Ind.
Boston State Hospital, Boston, Mass.
Retreat Mental Hospital, Retreat, Penn.
Lutheran Orphan Home, Kirkwood, Mo.
St. Francis Orphan Home, St. Louis, Mo.
California State Prison, San Quentin
State Prison, Stillwater, Minn.
Federal Jail, Tallahassee
State Hospital, Worcester, Mass.
Boys Industrial Home, Oakdale, Penn.
U. S. Veterans Hosp., Allingtown, Conn.
Sacred Heart Orphanage, Kearney, N.J.

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LITHO IN U.S.



BRADLEY DRINKING FOUNTAINS

Bradley Drinking Fountains are available in the same beautiful, durable marble and stone materials as Bradley Washfountains.

Type S: Side stream model with self-closing valve, built-in volume control and automatic pressure regulator. Can be arranged for continuous flow.

Type M: Multiple-stream model with self-closing valve, built-in volume control and automatic pressure regulator in each line. Can be arranged for continuous flow.



THE POWERS REGULATOR CO.

Skokie, Ill. • Offices in Over 50 Cities listed on Page 4

Pneumatic Systems of Automatic Temperature Control for all Types of Heating and Ventilating

Also the most complete line of Thermostatic Controls made for Water Heaters and all types of Shower Baths, see page 3.

MODERN CONTROLS FOR MODERN SCHOOL BUILDINGS



SMALL SIZE

Fits into narrow vertical spaces. Dimensions for both standard or Day-Night thermostats: 5⅝" H x 2⅞" W x 2¼" D.

POWERS ROOM THERMOSTATS

provide utmost comfort for teachers and pupils and maximum fuel economy. Users often report over 25 years of reliable low-maintenance-cost service. They are truly gradual acting and give smooth control of valves and dampers. Only two of the many styles available are shown above.

More Accurate Control with Powers PACKLESS Valves

for control of convectors, unit ventilators, radiators and radiant panel heating coils Powers PACKLESS Valves are superior in every way. Because they have no packing nut or gland to be tightened, oiled or adjusted there is no binding of valve stem as with conventional packing.

With their **duo-seal PACKLESS construction** (See B & C in drawing at right) and characterized throttling plug they give smooth control and insure correct flow of steam or hot water. Besides giving better performance they eliminate packing maintenance and leakage of water or steam.

No More Packing Maintenance





No More Steam or Water Leakage

For more than two generations the name POWERS has stood for quality products, proper installation, and SERVICE after installation whenever required.

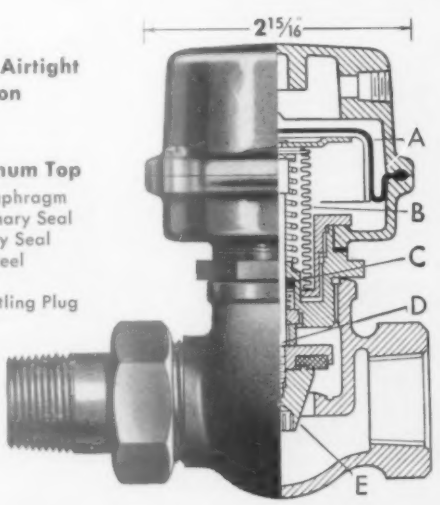
In discussing temperature control problems with Powers you can benefit from our many years of experience gained in thousands of schools from coast to coast and in prominent buildings at Harvard University, Massachusetts Institute of Technology, Carnegie Tech, Illinois Tech, U.C.L.A., California Institute of Technology, the U.S. Capitol building, UN Conference and Assembly Halls and in many other outstanding buildings.

Illustrated here and on page 2 are only a few of the many types of Powers control employed to regulate—

- **Unit Ventilator and Convector Systems**
- **Split Systems with Forced Ventilation and Convectors**
- **Radiant Panel Heating**
- **Warm Air Heating Systems with Single and Double Ducts**

For further information contact our nearest office shown on page 4 or write us direct.

Note Durable, Airtight Construction



Rugged Cast Aluminum Top

A) Durable Molded Diaphragm
B) Bronze Bellows, Primary Seal
C) "O" Ring, Secondary Seal
D) Polished Stainless Steel Valve Stem
E) Characterized Throttling Plug

Available in Various Types and Sizes

POWERS *NEW* Unit Ventilator Control System

Eliminates OVER-heated Classrooms and Insures Utmost Comfort and Fuel Economy

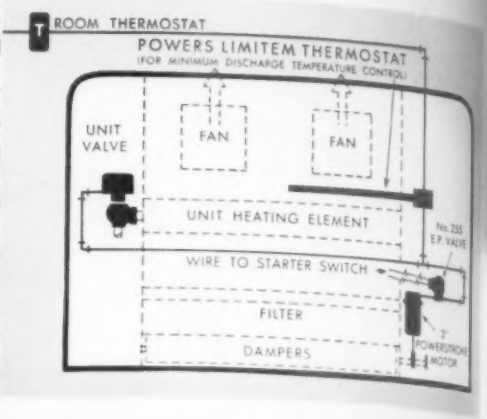
POWERS New



LIMITEM Low-Limit Airstream Thermostat

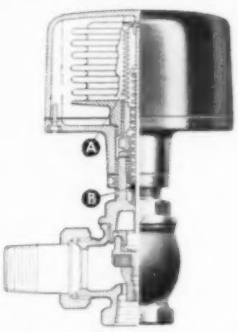
A Precision Instrument engineered to provide control for Unit Ventilator discharge temperatures—a critical requirement for classroom comfort.





POWERS PACKLESS Control Valves

Specially Designed for UNIT VENTILATORS



To Insure Better Control, All Valves are carefully sized for each unit.

Special duo-seal construction (a) primary seal; (b) secondary seal) reduces valve stem friction, eliminates packing maintenance and gives smooth control. High lift poppet provides 3 times as much travel for ½" valve as compared with previous valves. Characterized throttling plug insures correct flow of steam or hot water.

POWERSTROKE DAMPER OPERATOR, below: with hesitation spring gives smooth gradual operation of Unit Ventilator dampers.



POWERS

UNIT VENTILATOR TEMPERATURE CONTROL

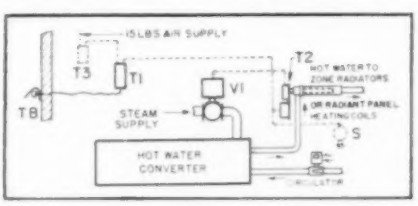
Gives More Accurate Control with Less Maintenance

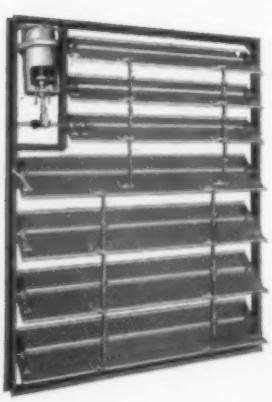
With its simple, direct control Powers gives close regulation without using complicated auxiliary devices. Thermostats, packless valve and damper operator are all engineered to give many years of reliable, trouble free service.

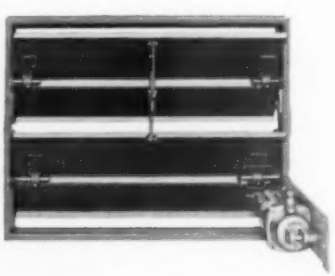
New LIMITEM Thermostat is the most accurate instrument made for low-limit control of unit ventilators. It incorporates such sound engineering principles as: Sturdy construction, accurate response, ingenious non-bleed double air valve to insure stable control with low hysteresis and Adjustable Sensitivity to give precise throttling range.

POWERS PACKLESS Control Valves are now standard for unit ventilators and convectors. You get a really modern temperature control system when you use POWERS. For further information contact your nearest Powers Office shown on page 4.

POWERS MASTROL SYSTEM of CONTROL for Forced Hot Water Heating and Panel Heating, etc. Temperature of water is maintained in direct relation to weather outdoors. Controls are shown below. Performance records show it is unsurpassed for reliability and low maintenance cost.







Powers Modern Damper Operators and Dampers are available in various types and sizes for all requirements.





Master-SubMaster Controls T1 and T2 are shown above. They regulate Powers **FLOWRITE** Valve V1 on right which controls flow of steam to hot water converter in above diagram of Powers **MASTROL** System of Control.

See List of Offices on Page 4.



Some of th : more than 50 showers at Freeport, Ill., Junior High School safeguarded by Powers Mixers.



One of the 180 Showers in Shaw Memorial Dormitory at Michigan State College equipped with Powers Mixers.



60 Powers Mixers at Palatine, Ill., Twnp. High School.

DOUBLE SAFETY of POWERS Type H Thermostatic WATER MIXERS Makes Them Best for Individual Showers



No shower bath is really MODERN or SAFE without the full protection provided by Powers Mixers. They *always* hold shower temperature constant wherever the bather wants it regardless of **pressure** or **temperature** changes in water supply lines. Failure of cold water supply instantly shuts off the shower.

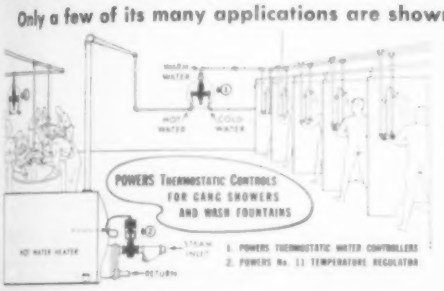
Because shower temperature is *thermostatically* limited to 115° F. by Powers mixers they give real protection against scalding caused by "dead-ends" in water supply lines.

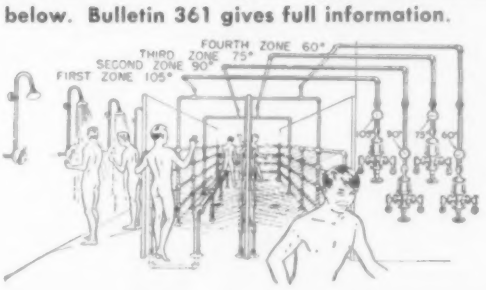
POWERS Mixers Save Water. No time or water is wasted by bather having to get out from under shower because of flucuating shower temperature. Water conservation feature alone makes Powers mixers a profitable investment.

Minimum of Maintenance. Their simple, durable construction insures years of dependable service. Contact our nearest office for further information, ask for **Bulletin 365.**

POWERS Thermostatic Water Controller for Multiple Type Showers

Only a few of its many applications are shown below. Bulletin 361 gives full information.





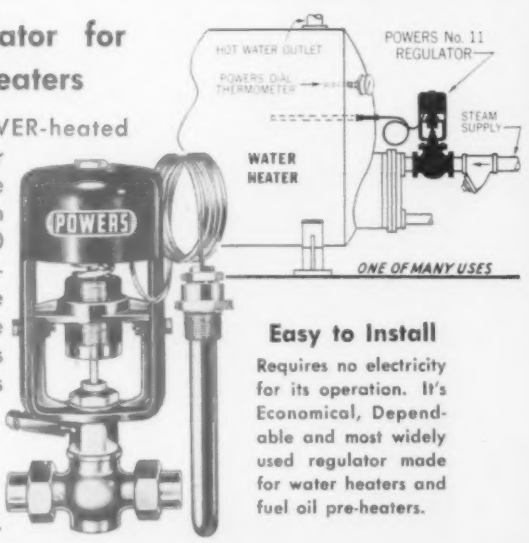


Capacities 22 to 125 gals. per min. @ 45 lbs. psi.

POWERS No. 11 Self-Operating Temperature Regulator for Water Storage Heaters



Automatically prevents OVER-heated water. Eliminates hot water complaints. Fuel savings alone often pay back its cost each year. Often lasts 15 to 20 years with minimum of maintenance. Once set for the proper temperature it can be forgotten. Bulletin 329 gives full information regarding its many superior features.



Easy to Install

Requires no electricity for its operation. It's Economical, Dependable and most widely used regulator made for water heaters and fuel oil pre-heaters.

Phone or Write Your Nearest POWERS Office Listed on Next Page for Bulletin 329.



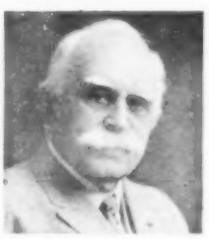
POWERS

SERVICE Available from Coast to Coast

Albany 5, N. Y., 1623 Central Ave.	UNion 9-6422
Albuquerque, N. M., 4607 Lomas Blvd., N. E.	Phone 6-0753
Atlanta, Ga., 1333 Spring St., N. W.	Elgin 2673
Baltimore 16, Md., 3414 Duvall Ave.	Liberty 2-2422
Birmingham 9, Ala., Box 5727, Homew'd Sta.	Phone 2-2866
Boston 21, Mass., 295 Columbia Rd.	Columbia 5-2430
Buffalo 2, N. Y., 250 Delaware Ave.	Madison 3581
Butte, Mont., 1100 E. Front St.	Phone 5457
Charleston 3, W. Va., 4801 Ohio St.	Phone 65-363
Chattanooga 1, Tenn., 938 Volunteer Bldg.	Phone 6-2632
Chicago 13, Ill., 3819 N. Ashland	Lakeview 5-3730
Cincinnati 4, Ohio, 2308 W. 8th St.	Grandview 2040
Cleveland 3, Ohio, 1670 E. 40th St.	Endicott 1-6150
Columbus 15, Ohio, 81 E. State St.	Columbus 8-1659
Coral Gables, Fla., 581 S. W. 47th Ave.	Phone 83-3885
Dallas 7, Texas, 2029 Levee St.	Sterling 5838
Dayton, Ohio, 381 West 1st St.	Adams 2987
Denver 1, Colo., P.O. Box 614	Keystone 0035
Des Moines 14, Ia., 907 Sixth Ave.	Phone 2-9606
Detroit 1, Mich., 2631 Woodward Ave.	Woodward 2-4267
Greensboro, N. C., 101 N. Elm St.	Greensboro 2-6204
Hartford 5, Conn., 190 Beacon St.	Hartford 32-4497
Houston 6, Tex., 3219 Milam St.	Lynchburg 3901
Indianapolis 2, Ind., 1216 N. Pennsylvania Ave.	Plaza 0349
Jacksonville 4, Fla., 115 Park St.	Phone 3-0517
Kansas City 8, Mo., 1510 Main St.	Victor 6161
Los Angeles 26, Calif., 3200 W. Temple St.	Dunkirk 4-4187
Louisville 2, Ky., 633 S. Fifth St.	Wabash 6842
Lubbock, Tex., 1503 Avenue J	Phone 2-1302
Memphis 3, Tenn., 215 Madison Ave.	Phone 8-4405
Milwaukee 8, Wis., 1348 N. 37th St.	Division 2-5700
Minneapolis 6, Minn., 3324 Hiawatha Av., S.	Parkway 1-2465
Nashville 4, Tenn., 802 Clark Place	Phone 6-3223
New Orleans 19, La., 3144 Paris Ave.	Bywater 2751
New York 17, N. Y., 231 E. 46th St.	Murray Hill 4-4310
Oklahoma City 6, Okla., 1726 N. W. 5th St.	Forest 5-7212
Peoria Heights 4, Ill., 327 W. Glen Ave.	Phone 5-5210
Philadelphia 11, Pa., 6428 Rising Sun Ave.	Pilgrim 5-6700
Pittsburgh 16, Pa., 1612 Potomac Ave.	Locust 1-7720
Portland 6, Me., Box 132	Portland 6-2766
Portland 5, Ore., 921 Southwest Oak St.	Atwater 6543
Rochester 8, N. Y., 135 Spring St.	Hamilton 3944
St. Louis 8, Mo., 3805 Washington Ave.	Jefferson 1-3126
Salt Lake City 1, Utah, 204 Doofy Bldg.	Phone 4-6421
San Antonio 6, Tex., P.O. Box 689	Fannin 7229
San Francisco 3, Cal., 314 Seventh St.	Underhill 1-6643
Seattle 99, Wash., 2800 15th Ave. West	Alder 5717
Spokane 8, Wash., North 120 Division St.	Phone MA 2933
Syracuse 4, N. Y., 509 N. Onondaga St.	Phone 75-0270
Tulsa 3, Okla., 910 South Boston	Phone 54-0709
Washington 6, D. C., 2039 "K" St., N. W.	Phone NA 8-3570
Honolulu 3, Hawaii, P.O. 2755	Phone 6401
Mexico City, D.F.	Apartado 63 Bis

POWERS TEMPERATURE AND HUMIDITY CONTROL

Since 1891



WILLIAM PENN POWERS . . . with his invention of the first all pneumatic system of temperature control and gradual acting vapor disc thermostat made an invaluable contribution to the modern science of heating, ventilating and air conditioning.

Factory and General Office Building of **THE POWERS REGULATOR COMPANY** Skokie, Ill.

The World's Most Modern Factory Producing Automatic Temperature and Humidity Control



THE HALSEY W. TAYLOR CO.

Manufacturers of Drinking Fountains and Coolers

Warren, Ohio

AGENTS IN PRINCIPAL CITIES

PRODUCTS

Drinking fountains, pedestal, recessed and wall types. Water coolers, electric, and ice and bottle types.

DISTINCTIVE FEATURES THAT APPEAL TO ARCHITECT AND SCHOOL AUTHORITIES

Over the years Halsey Taylor Drinking Fountains have attained an enviable reputation for positive sanitation and conveniences in thousands of installations the world over. During the first world war and again in the second, these fountains won the approval of the Government and Military authorities as the ideal sanitary fountains, continually improved and refined. Halsey Taylor Drinking Fountains are today the most modern and dependable in use, for schools, hospitals, hotels, municipal and public buildings, churches and commercial and industrial operation.



It will pay you to investigate Halsey Taylor modern, sanitary drinking fountains which give you definite assurance of dependable, trouble-free service, proper health safety, maximum conveniences, built-in patented features exclusive with Halsey Taylor. Be sure, be safe, buy Halsey Taylor for health safety!

School authorities can be sure of health safety and long, dependable trouble-free service when they specify the correct Halsey Taylor fountain for their buildings.

1—**Practical Automatic Stream Control**—Automatic device maintains constant height in drinking stream regardless of line pressure variation. Stream never too high, never too low.

2—**Ideal Drinking Mound**—The two-stream projector with latest type guard makes the side stream both practical and healthsafe, removing objections found with ordinary side-streams.

3—**Definite Sanitation**—Drinking mound formed by converging of two streams of water, setting up a localized drinking mound which makes it impractical to drink from any other point. Fingers or lips cannot come in contact with or contaminate water source.

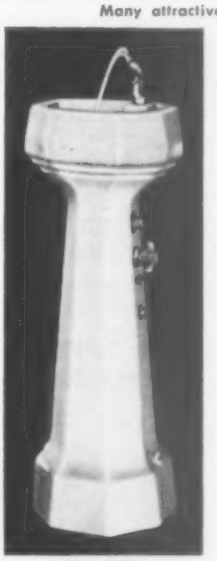
Fountains for every requirement: This page shows you but a few of the various types of the Halsey Taylor drinking fountains. There is a model for your every need, all of them modern in styling and all incorporate the exclusive Taylor features. Write today for a complete catalog.

It's Practical—The Halsey Taylor LO-LEVEL Cafeteria Cooler

Halsey Taylor again leads the field with a Lo-Level cooler, the cooler that is ideal for all places where small children congregate. This is but one of the many distinctive models that you will find by writing for a catalog of Halsey Taylor Electric Water Coolers.



Many attractive Pedestal and Wall types



No. 4615

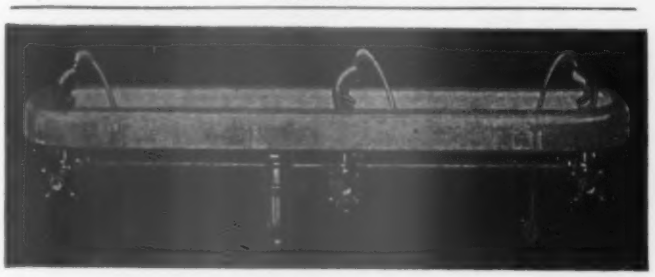


No. 4914



No. 4901

Battery Types
Many two- and three-part battery types especially adapted to school installations



No. 2703

CENTURY BRASS WORKS, INC.

1100 North Illinois Street, Belleville, Illinois

Manufacturers of Sanitary Drinking Fountain Equipment Since 1917

Century FOUNTAINS

One of America's Fastest Growing Lines

Year after year CENTURY'S share of the nation's drinking fountain business increases. Schools, public institutions, industry, architects, engineers, wholesalers, builders and plumbing contractors are responsible. They recognize CENTURY QUALITY—when they specify and insist on CENTURY SANITARY DRINKING FOUNTAINS they are getting the FINEST AVAILABLE.



No. 700

Century Automatic Volume Control BUBBLER HEADS

No. 700 - and - No. 900-S

feature automatic stream control which is built into the Bubbler Head itself, thereby eliminating the necessity of a separate flow regulator.

These patented bubblers are self-adjusting to normal variations in water pressure. They maintain a constant desirable drinking stream at all times—one which will not exceed the limits of the receptor.

Add to this CENTURY'S positive ANTI-SQUIRT feature and you can readily see why CENTURY AUTOMATIC BUBBLERS and FOUNTAINS are so tremendously popular in our nation's schools and industrial plants.



No. 900-S



No. 9-20

For greater SAFETY, SANITATION and CONSERVATION of water, plus continual TROUBLE-FREE SERVICE, insist on the finest . . .



No. 9-10



No. 9-46

Century SANITARY DRINKING Fountains

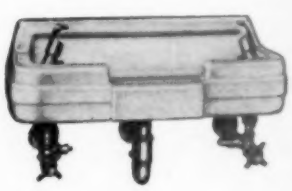
NOTE: Practically all Century Fountains are designed with elevated bubbler bases to meet the most rigid health and sanitary codes.



No. 6-45



No. 6-67-3



No. 6-40 A

A Modern Sanitary Drinking Fountain Available for Every Requirement

COMPLETE CATALOG FURNISHED ON REQUEST

CORDLEY & HAYES

451 Fourth Avenue, New York 16, N. Y.



...in a class by itself!



MODEL HJ-6

Junior model built expressly for children. Only 31 inches high—the ideal height for children's use. A completely standard Cordley Electric Water Cooler with full-sized mechanical parts contained in industrial types including completely sealed refrigerant system.



STANDARD TYPES
Sizes from 5 to 20 gallons per hour.



REFRIGERATOR TYPES
Available in bottle or bubbler types.



REMOTE TYPES
Sizes from 3 to 10 gallons per hour. Ideal for connection to fixed drinking outlets.

WATER COOLERS IS OUR BUSINESS

As a matter of fact, our sole business. And because we make no other type of equipment, our entire efforts are concentrated on top quality water coolers to reflect the sterling reputation built up through 65 years and the sale of more than 1,000,000 water coolers.

comprehensive five-year warranty

IN addition to many other unique features, every user of Cordley Hermetic Electric Water Coolers is protected for a period of five-years from the date of installation. This warranty covers replacement of the entire cooler if a defect occurs within the hermetic factory-sealed refrigerant system or the cooling tank. Copy of the complete warranty will be supplied upon request.

MODELS FOR EVERY DRINKING WATER NEED

The diversified line of more than 20 models comprising bubbler, bottle, refrigerator, remote, water-cooled and explosion-proof types makes available a water cooler for every drinking water need—in grade schools, high schools, colleges, auditoriums, laboratories, administration offices, etc.

WHERE TO OBTAIN THEM

Cordley Electric Water Coolers are available nationally through plumbing, industrial and other leading supply houses. Consult your classified directory or write to Cordley & Hayes.

ELECTRIC-AIRE ENGINEERING CORP.

209 W. Jackson Blvd. • Chicago 6, Illinois

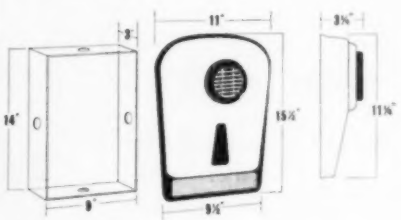
SPECIALISTS IN ELECTRIC DRYING—33 YEARS of RESEARCH and EXPERIENCE in the DEVELOPMENT of ELECTRIC DRYERS

NEW "C" MODELS ELECTRIC-AIRE HAND DRYERS

CHOSEN BY LEADING SCHOOL SYSTEMS—SPECIFIED BY SCHOOL ARCHITECTS

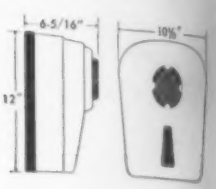


INSTALLATION OF RECESSED MODEL
Steel wall box set 36½" from finished floor line to bottom of box during wall construction. Mechanism and cover plates easily installed on completion of building.





THREE-POINT WALL MOUNTING
Eliminates vibration. Assures quiet operation. Reduces installation costs. Insures solid mounting on uneven walls.



RECESSED MODEL—For installation in new or remodeled walls. Has special built-in, non-breakable air filter—quickly and easily cleaned without removing.

SURFACE MODEL—For installation on existing walls. Quickly and easily mounted. Cover attached to wall casting by means of vandal proof round head Allen screws.

AERODYNAMICALLY ENGINEERED AND DESIGNED TO PROVIDE A LOW COST, DEPENDABLE, LONG LIFE AND ATTRACTIVE DRYING SERVICE FOR YOUR SCHOOL WASHROOMS!

- Electric-lighted instructions built into the housing. Lights at touch of the starter bar. Insures fast drying.
- New type air baffle—baffles air any direction to provide convenient and pleasant face and fore-arm drying.
- Non-breakable and non-conducting heating element guard and push bar. "Boy-Proof"—specially designed for school and public washroom use.
- Attractive, endurable all steel, porcelain enameled housing—non-breakable, non-chipping.
- All working parts easily accessible for renewal of motor brushes, cleaning and annual brush inspection. No oiling necessary.
- Non-breakable, *permanent type air filter*. Quickly and easily brushed without removing cover.
- Greatly increased uni-flow air volume and velocity makes Electric-Aire the fastest drying unit on the market. 20 seconds for hands—30 seconds for face and hands.
- Direct motor driven fan, *vertically mounted*—insures extra long life, maintains uniform balance.
- 1/10 H.P. self-cleaning and self-cooling motor with life-lubricated sealed ball bearings. Protected by 1.6 amp. fusetron. *Special long-life brushes*—25,000 hours, representing 3,000,000 drys.
- Quickly removable, interchangeable mechanism—three point *rubber mounted* to eliminate vibration.
- TWENTY-FIVE PERCENT (25%) LESS current consumption—only 15 amps.
- Thermo-fused circuit breaker eliminates burned-out heating elements. *Three times heavier* than other types.
- Completely insulated and shockproof.

ELECTRICAL SPECIFICATIONS: 110-25 A.C.; 1/10 H.P. life lubricated ball bearing motor; consumption 15 amps.

Underwriter's Laboratory Approved.



ELECTRIC-AIRE HAIR DRYERS
Speed Up Washroom Traffic

Recognized by leading authorities as the fastest and most efficient of hair dryers. Thoroughly drys the heaviest head of hair in three minutes. Helps prevent colds.

DIMENSIONS: 10½" wide, 12" high, 6-5/16" deep.

WRITE FOR NEW ELECTRIC DRYER LITERATURE

Architects: Should request A1A File 31-L—contains mounting drawings, detail specifications and catalog sheet.

School Officials: Ask for washroom maintenance file 31-M—contains towel cost comparison with Electric-Aire operations, list of users and prices.

ELECTRIC-AIRE ENGINEERING CORP. Dept. W
209 W. Jackson Blvd. • Chicago 6, Illinois

ELECTRIC-AIRE CO. of CANADA
669 Talbot St. • St. Thomas, Ontario

LAWLER AUTOMATIC CONTROLS, INC.

453 North MacQuesten Parkway, Mt. Vernon, N. Y.

The LAWLER LINE of Thermostatic Control Valves

Since 1897 Lawler Automatic Controls, Inc. and its predecessor, Lawler Regulator Company, has designed and manufactured thermostatic equipment for automatically regulating the temperature of fluids, under predetermined conditions of pressure and volume. The firm has grown steadily until today it is one of the largest exclusive manufacturers of such devices.

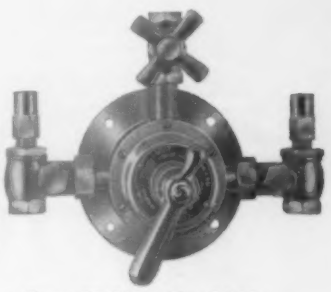


SHOWER MIXERS
(one or two outlets)

Capacities: { type BE 5 GPM to 20 GPM
type BC 5 GPM to 20 GPM

Lawler Shower Mixers deliver water at the desired temperature to individual fixtures by thermostatically mixing hot and cold water. Delivered water temperature may be varied between "COLD" and "WARM" to the desired maximum, "HOT" by moving pointer handle. BC valve furnished with circular escutcheons, BE with wall plate, cast integrally with the body. Rough brass or polished chrome plate finish.

◀ Type BC Plate No. 2113



Type BE Plate No. 2042



Plate No. 5198

DEVELOPING TANK ASSEMBLY

Automatically controls the flow and temperature of water supplied to the developing tank. Several different and more elaborate assemblies are available. Rough brass, polished brass or chrome plate finish.

CABINET ASSEMBLIES

Lawler products can be supplied in complete cabinet assemblies or wall arrangements . . . built to meet particular specifications. Shown in plate no. 2030 is a Lane or Group shower assembly using a Lawler model BAM #3 thermostatic water controller.

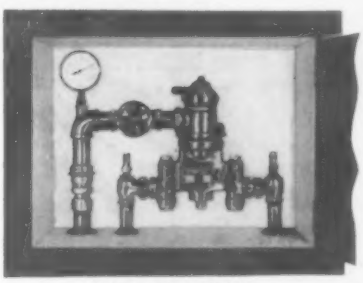


Plate No. 2030

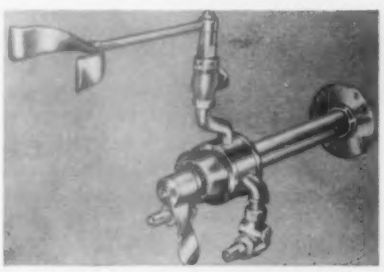


Plate No. 2072

KNEE OPERATED TYPE K

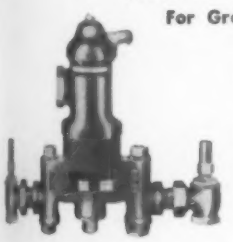
Allows accurate control of both volume and temperature of running water without using hands. Can also be supplied in pedal type.

WATER CONTROLLERS

For Group Showers

Capacities 15 to 200 GPM at 45 psi

Used where water at a predetermined temperature may be required from two or more outlets or from a single outlet where a large quantity is needed. Furnished complete with removable built-in strainers, check valves and union angle loose key stops. Finished in rough brass or polished chrome plate.



Type BAM Plate No. 5220

WATER PRESSURE EQUALIZERS

Maintain equal pressures to the fixtures in the hot and cold water lines, regardless of any variance of pressures in the supply lines.

Sizes: ½" up to and including 2"

Finish as desired: rough brass, white chrome or polished chrome plate



Plate No. 2059

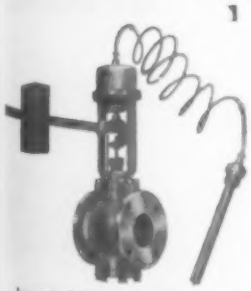
TEMPERATURE REGULATORS TYPE "S"

Accurately controls the temperature of steam-heated hot water and other liquids. Reverse Acting Type "S" regulators control cooling systems and recirculating lines.

Standard temperature ranges are adjustable over a spread of 40°F. They are:

Range No.	Degrees F.	Range No.	Degrees F.
J-4	100°-140°	M-8	140°-180°
K-6	120°-160°	N-10	160°-200°

Other temperature ranges can be furnished. SIZES: ¼" up to and including 5". Bronze or stainless steel trim. ¼" to 2" Bronze Body, Union, Ends; 2½" to 5" Iron Body, Flanged Ends. 2" both types.



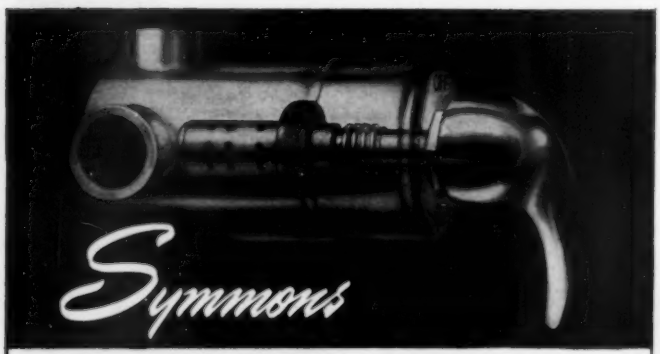
Lever and Weight Adjustment
Plate No. 5221



Spring Adjustment
Plate No. 2051

SYMMONS ENGINEERING COMPANY

791 Tremont St., Boston 18, Mass.



SAFETYMIX

PROTECTS AGAINST SHOWER SCALDS

SAFETYMIX — The pressure-actuated non-scald shower valve is now standard equipment in schools and colleges everywhere. This is because sudden "scalds" in showers are caused only by *fluctuations of pressure*. SAFETYMIX gives positive control over these pressure changes. It is the only non-scald shower valve guaranteed to maintain discharge temperature within 2° F against pressure fluctuations up to 85% in either hot or cold supplies. Costs no more than ordinary valves, is simple to install and is as easy to fix as a faucet.

SOME SAFETYMIX USERS

Michigan State College, M. I. T., Dartmouth, U. of Cincinnati, Johns Hopkins, State Teachers, Wellesley, U. of Chicago, U. of Maine, Brown U., Conn. College, Holy Cross, Leland Stanford, Marquette U., Austing Public Schools, U. of Washington, DePau, Western Reserve, U. of Pittsburgh, Wm. & Mary, Loyola, etc., etc.

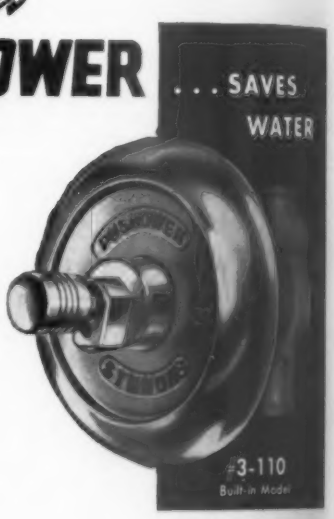
Symmons NEW SPRAY SELECTOR MULTI-FLO SHOWER HEAD



An All-Purpose Head for Needle, Rain, or Flood flow, as desired. Full Pattern Spray. Adjustable Spray Control. Separate Volume Control. Self-cleaning action. Chrome-bronze construction. Symmons quality.

Symmons PUSHOWER

AUTOMATIC SHOWER LIMITER



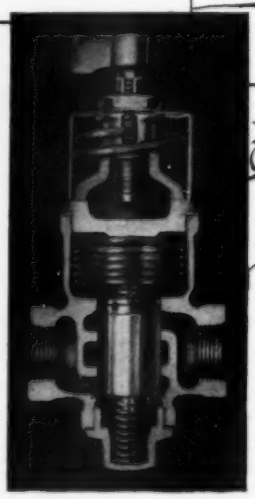
All parts accessible from front available in either exposed or concealed models with accessories as desired.

"PUSHOWER" GIVES YOU:

1. Water Savings
2. Lower H.W. Heating Costs
3. Smaller Supply Tanks
4. Positive Action
5. Easy Installation
6. Dependable Service
7. Symmons Quality

FOR FURTHER INFORMATION WRITE FACTORY DIRECT OR CONTACT NEAREST WHOLESALE PLUMBING DISTRIBUTOR

Symmons THERMOSTATIC TEMPERING CONTROLLER



T-C FACTS

A. Accurately maintains constant discharge temperature of hot water at outlet, regardless of tank or tankless heater temperature variations.

B. *Automatically* compensates for all normal pressure changes.

C. Install at heater as Master Control, or anywhere in line as a Zone Control.

D. Adjustable dial temperature settings from 90° F to 180° F. Automatically shuts down on failure of either supply.

E. A foolproof, thermostatic unit with solid fill bellows mounted out of water in a protected chamber. Not subject to corrosive deterioration. Interchangeable unit, easily replaced. Available in four sizes. Guaranteed Symmons quality

BENJAMIN ELECTRIC MFG. CO.

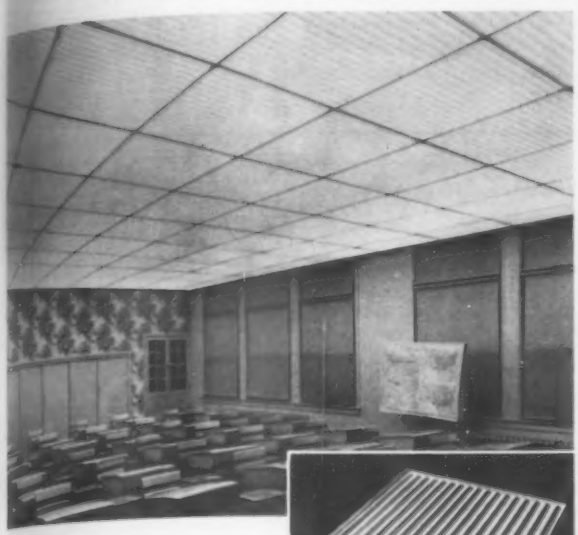
General Offices: Des Plaines (Chicago Suburb), Ill.

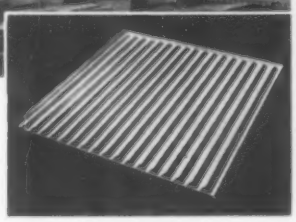
435-37 W. 19th
NEW YORK

20 N. Wacker Drive
CHICAGO

829 Folsom St.
SAN FRANCISCO

LIGHTING INTERIOR AREAS





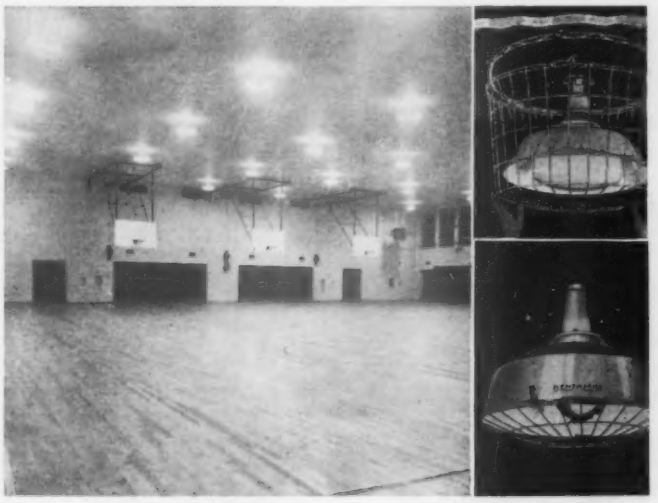
"PANEL-GLO"

Translucent Wall-to-Wall Luminous Ceilings

The new Benjamin "Sky-Glo" and "Panel-Glo" are the latest engineering developments in ceiling lighting systems. Many new features cut installation costs and make ordering easy, such as: ON-THE-SPOT estimating of COST; available by the SQUARE-FOOT; a finishing strip that simplifies bringing the louver or panel right up to the walls of a room; ONE SIZE louver and panel (3'x3').

MATERIAL—Translucent, white vinylite which is odorless, non-toxic and will not distort or shrink due to water absorption. Does not support combustion. De-staticized so that dust won't tend to cling to surface.

TYPES OF SUSPENSION—Five-inch ceiling strap, for suspension from ceiling of solid construction. Toggle head type for suspension from ceiling of hollow construction. Rod Couplings to join suspension rods for long suspensions.



GYMNASIUM UNITS

For Lighting Indoor Play-Areas

Recreation area locations require a lighting unit that is well protected against jars and hard knocks. In addition, the lighting unit must provide good general illumination so that fast-flying objects such as basketballs can be readily seen by players and spectators.

For such locations, the Benjamin Glassteel Diffusers and enclosing globe units with the Benjamin two-piece wire guard are recommended. See top illustration at right.

The Benjamin "Silvered-Lamp" Gymnasium unit is also excellent for these locations. See bottom illustration at right. This unit has a heavy, basket-type steel wire guard over the reflector opening for lamp protection. A large, circular hole in center of wire guard allows easy insertion of lamp-changers.

"Grid-Lite" *Lighting System*

for • drafting rooms • classrooms



AMERICAN SCHOOL AND UNIVERSITY—1954–55

The "GRID-LITE" system consists of a grid or network of steel channels spread over the entire ceiling. These channels carry the necessary wiring and support either TRANSLUCENT DIFFUSER SHIELDS or BENJAMIN ACOUSTICAL BAFFLES in combination with efficient Slimline lamps.

FEATURES

Prewired—The only wiring to be done is the connection of various line wires.

Easy Installation—Channels plug into each other end to end and spacer channels snap into the sides of these. No couplings needed.

Little Maintenance—Practically no horizontal surfaces where dust can collect.

45-Degree Crosswise Lamp Shielding

High Efficiency with Good Distribution

Easy to Specify and Order

BENJAMIN ELECTRIC MFG. CO.

BENJAMIN-LEADER LINE FOR INTERIOR LIGHTING

OFFICER SERIES



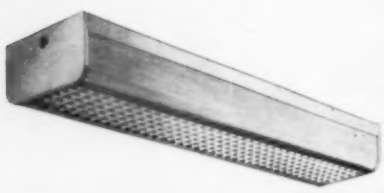


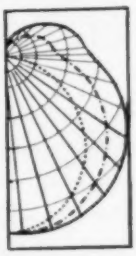
A streamlined and beautifully proportioned fixture that adds glamor to any school interior. Has hinged molded louver. Individual units listed at right have 31° plastic louver and curved plastic sides. Also available; 45° plastic louver; white enameled steel sides; stem suspensions; units for continuous line mounting.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
VL-240-31°P	2-40W. Bi	53⅜	10¼	5⅞
VL-340-31°P	3-40W. Bi	53⅜	10¼	5⅞
VL-440-31°P	4-40W. Bi	53⅜	10¼	5⅞
VL-248-31°P	2-48", T12 Slim	53⅜	16¼	5⅞
VL-348-31°P	3-48", T12 Slim	53⅜	10¼	5⅞
VL-448-31°P	4-48", T12 Slim	53⅜	16¼	5⅞
VL-296-31°P	2-96", T12 Slim	101¼	10¼	5⅞
VL-396-31°P	3-96", T12 Slim	101¼	10¼	5⅞
VL-496-31°P	4-96", T12 Slim	101¼	16¼	5⅞

*For 110-125V. oper. (Other voltages available) FS-4 Starters Standard on Bipin Units.

PTE SERIES



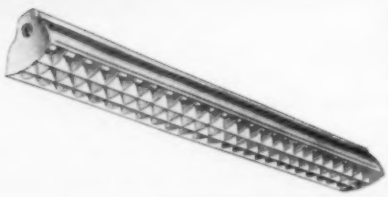


Designed to meet the problems encountered in school lighting today. Individual units listed at right have Alba-Lite glass sides and Alba-Lite glass hinged bottom. May be mounted individually or in continuous lines. Also available with molded plastic louver (40° x 40°) shielding; Lucite Lens; plastic sides; stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
PTE-240	2-40W. Bi	48⅛	14⅝	6⅝
PTE-340	3-40W. Bi	48⅛	14⅝	6⅝
PTE-440	4-40W. Bi	48⅛	14⅝	6⅝
PTE-248	2-48", T12 Slim	48⅛	14⅝	6⅝
PTE-348	3-48", T12 Slim	48⅛	14⅝	6⅝
PTE-448	4-48", T12 Slim	48⅛	14⅝	6⅝
PTE-296	2-96", T12 Slim	96⅛	14⅝	6⅝
PTE-396	3-96", T12 Slim	96⅛	14⅝	6⅝
PTE-496	4-96", T12 Slim	96⅛	14⅝	6⅝

*For 110-125V. oper. (Other voltages available) FS-4 starters standard on Bipin Units.

SCHOOLMASTER SERIES





Ideal for classrooms, libraries, etc. Provides 70% direct and 30% indirect illumination. Individual units listed at right have steel louver (35° x 25° shielding) on 2- and 3-lamp, (45° x 25°) on 4-lamp units, and steel sides. May be mounted individually or in continuous lines. Also available with steel louver 35° x 45° (for 2- and 3-lamp units) or 45° x 45° (for 4-lamp units), plastic sides; and stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
SM-240	2-40W. Bi	48½	12⅝	6⅝
SM-340	3-40W. Bi	48½	12⅝	6⅝
SM-440	4-40W. Bi	48½	12⅝	6⅝
SM-248	2-48", T12 Slim	48½	12⅝	6⅝
SM-348	3-48", T12 Slim	48½	12⅝	6⅝
SM-448	4-48", T12 Slim	48½	12⅝	6⅝
SM-296	2-96", T12 Slim	96½	12⅝	6⅝
SM-396	3-96", T12 Slim	96½	12⅝	6⅝
SM-496	4-96", T12 Slim	96½	12⅝	6⅝

*For 110-125V. oper. (Other voltages available) FS-4 starters standard on Bipin Units.

VARSITY SERIES





The economical unit for classrooms, libraries and offices. Provides 60% direct and 40% indirect illumination. Individual units listed at right have steel sides and steel louver (35° x 25° shielding). May be mounted individually or in continuous lines. Also available with plastic sides, diffused Alzak finish, and stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
V-240	2-40W. Bi	48½	12⅝	6⅝
V-248	2-48", T12 Slim	48½	12⅝	6⅝
V-272	2-72", T12 Slim	72½	12⅝	6⅝
V-296	2-96", T12 Slim	96½	12⅝	6⅝

*For 110-125V. oper. (Other voltages available) FS-4 starters standard on Bipin Units.

NEW VARSITY SERIES





A beautiful, quality engineered fixture. Ideal for drafting rooms, libraries, offices and classrooms. Affords large amounts of glareless light, with the use of 40° x 40° egg-crate louver and ribbed plastic sides. May be mounted individually or in continuous line. Units are available with stem suspensions.

Cat. No.*	No. and Type of Lamps	Dimensions—In. Length	Width	Depth
NV-240	2-40W. Bi	48½	13⅜	6"
NV-340	3-40W. Bi	48½	13⅜	6"
NV-440	4-40W. Bi	48½	13⅜	6"
NV-248	2-48" Slim	48½	13⅜	6"
NV-348	3-48" Slim	48½	13⅜	6"
NV-448	4-48" Slim	48½	13⅜	6"
NV-296	2-96" Slim	96½	13⅜	6"
NV-396	3-96" Slim	96½	13⅜	6"
NV-496	4-96" Slim	96½	13⅜	6"

*For 110-125V. oper. (Other voltages available) FS-4 starters standard on Bipin Units.

CORRI-LITE



Designed for lighting corridors, narrow rooms, offices and stores efficiently and economically. Its unusually styled, steel baffles add to the modern effect of the fixture and provide correct shielding. For individual or continuous line. (COR-2172 and COR-2196 listed at right are two units in line).

Slimline Units for 110-125 V., 60 Cycle Operation

Cat. No.	Lamps	Length	Width	Depth
COR-148	1-48"-Slim	48⅛"	6⅝"	7⅛"
COR-172	1-72"-Slim	72⅛"	6⅝"	7⅛"
COR-196	1-96"-Slim	96⅛"	6⅝"	7⅛"
COR-2172	2-72"-Slim	144⅛"	6⅝"	7⅛"
COR-2196	2-96"-Slim	192⅛"	6⅝"	7⅛"

Canopy suspension stems available.

FLOODLIGHTING SPORTS AREAS

HUNDREDS OF SCHOOLS throughout the country have found the answers to their problems of stimulating attendance and increasing revenue from football in Benjamin floodlighting for night games.

Night football, just like softball and other floodlighted night sports, is assured of a greater following because it takes advantage of most people's leisure time and offers them entertainment at a time when they are free and seeking it.



Illumination for the football field of Loyola University in New Orleans, Louisiana, is provided by Benjamin "Play-Area" floodlights using 1500 watt lamps



An installation of Benjamin Aluminum floodlights using 1500 watt lamps at Bowman Gray Memorial Stadium, Winston-Salem, North Carolina



"SENIOR PLAY-AREA"
For 750-1500 watt lamps



"ELLIPTO-LITE PLAY-AREA"
For 300-500, 750-1500 watt lamps



New Aluminum "Olympia" Floodlight for 750-1500 watt lamps



Easy relamping and maintenance are features of "Olympia" design

OPEN-TYPE, PORCELAIN ENAMELED FLOODLIGHTS

Benjamin "Senior Play-Area" Floodlights meet every requirement of football lighting by providing exceptionally high intensity illumination forward and toward the sides of the floodlighting unit. They combine in one unit a large open-type porcelain enameled steel reflector with an inner auxiliary reflector of processed oxidized aluminum which assists in building up illumination over distant areas.

Benjamin "Ellipto-Lite Play-Area" Floodlights are similar in general construction to "Senior Play-Area" Floodlights, but are provided with a slightly smaller porcelain enameled steel reflector. In light output they compare favorably with the "Senior Play-Area" Floodlights.

NEW "OLYMPIA" ENCLOSED-TYPE, ALUMINUM FLOODLIGHTS

This line of weatherproof, aluminum floodlights is designed primarily for sports lighting, but is equally suitable for general floodlighting. They are available with narrow, medium or wide beam spreads.

Non-Ferrous, Weatherproof Construction—All exposed metal parts are aluminum or other non-ferrous material except for the steel trunnion bracket. This construction reduces the tendency of movable parts to "freeze" and prevents rust streaks on the reflection surfaces. Heat and impact resisting glass is "spun" into the reflector as permanent protection for the lamp against rain, dirt and insects.

Detachable Hood for Quick, Safe Maintenance—Floodlight hood, socket, lamp and wiring are removed, as a one-piece assembly, by simply loosening two wing nuts. The reflector can be swung up and back for cleaning, then returned to the original position without special adjustment.

Quick, Accurate Positioning—Convenient degree scales are provided for horizontal and vertical adjustment. Floodlights are quickly aimed by means of a removable sighting tube and lock in position by a large, hand-operated, wing nut on each trunnion arm.

CURTIS LIGHTING, INC.

Dept. AS-4, 6135 W. 65th Street, Chicago 38, Illinois

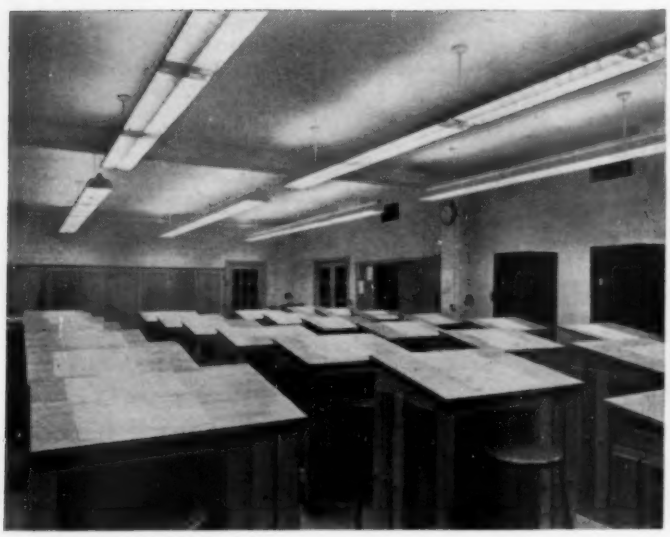
LIGHT FOR EVERY SCHOOL REQUIREMENT

NEW YORK
TORONTO, CANADA

CURTIS
LIGHTING, INC.

6135 W. 65 STREET
CHICAGO 38, ILLINOIS

Curtis "Forty-Sixty"



Fluorescent luminaires installed in a school drafting room. These low-brightness units illuminate the ceiling with an indirect component of approximately 40% of the light output of the luminaire. The 60% direct component is louvered to provide adequate shielding. These efficient units attain high levels of quality illumination without annoying glare.



This music room required general overall illumination as well as high level quality lighting at the music stand level. The Curtis "Forty-Sixty" luminaire provides illumination on the ceiling to relieve brightness contrast and also provides necessary light on the working plane. Write for Bulletin No. 2400.





The illustrations above show the newest concept in school lighting. This exclusive Curtis "Light and Sound Conditioning System" provides recommended levels of low-brightness illumination plus effective acoustical treatment at low initial cost, low installation cost and low maintenance cost. The Curtis system is recommended for classrooms, school offices and auditoriums and will accommodate all room sizes. Write for Bulletin No. 2418.

QUALITY SCHOOL LIGHTING SINCE 1897

THERE IS A CURTIS REPRESENTATIVE NEAR YOU TO SOLVE ANY LIGHTING PROBLEMS

CURTIS LIGHTING, INC.

6135 W. 65 STREET
CHICAGO 38, ILLINOIS

In every phase of school lighting, whether it be the classroom, auditorium, gymnasium, principal's office or school corridor, Curtis luminaires can be depended upon to provide quality illumination. There is a Curtis luminaire designed to fit your specific requirements. For more than half a century Curtis luminaires have been installed in schools of all types throughout the country. The Curtis roster of school lighting installations includes some of the largest universities and colleges in the country as well as many schools in small rural districts. To solve your lighting problems, write for the name of your nearest Curtis representative. No cost or obligation.



Curtis "Sno-Flake" illustrated above is shown in a typical classroom installation. It presents an entirely new concept in design for indirect incandescent illumination. Write for Bulletin No. 2407.





These excellent gymnasium lighting installations utilize the famous Curtis "X-Ray Reflector." Scientifically designed with outer reflector surface of pure silver protected by "Golden Armor." The Golden Armor is a special patented process developed in the Curtis Research Laboratories to keep the pure silver reflector surface always at original efficiency. These units are available for either recessing or pendent mounting. Write for Bulletin No. 2409.

GENERAL ELECTRIC COMPANY

Apparatus Sales Division

Schenectady 5, N. Y.



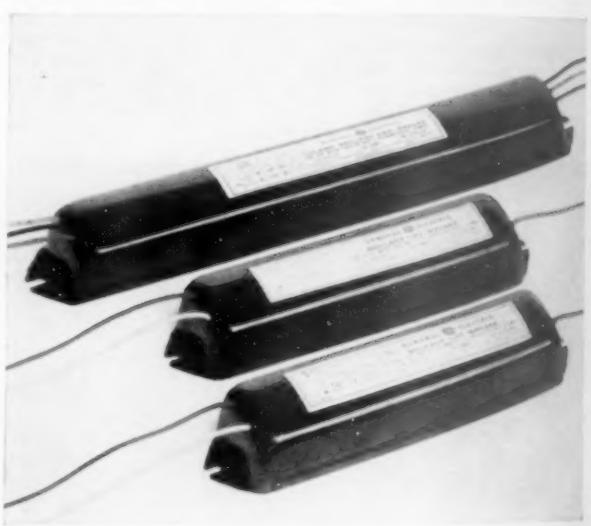
Top-quality General Electric ballasts provide quiet, flickerless operation of fluorescent fixtures in well-lighted classrooms like this one.

HERE'S WHAT GOOD BALLASTS MEAN TO YOUR SCHOOL FLUORESCENT LIGHTING

The light and life of every fluorescent lamp depend upon a current-limiting device called a ballast. How well it controls the flow of electricity to the lamp affects not only the seeing conditions in your fluorescent lighting areas but also your costs for installation, operation, and replacement.

General Electric's complete line of fluorescent ballasts gives you the quiet and dependable operation you need in every type of educational fluorescent lighting. These top-quality ballasts reflect the sound design and solid construction that keep efficiency up and costs down—proof of the quality that has built G. E.'s reputation as the leader in the ballast industry.

When your school installs new fluorescent fixtures or replaces old ones, make sure you obtain the economy that results from the use of good ballasts. Specify General Electric. For further information, call your nearest G-E Apparatus Sales Office, or write to *General Electric Company, Section 640-382, Schenectady 5, New York.*



General Electric engineering skill has made these high-power-factor ballasts among the quietest ever mass-produced.

GENERAL ELECTRIC

THE EDWIN F. GUTH COMPANY

2615 Washington Ave., St. Louis, Mo.

Guth

THE REALLY COMPLETE LINE OF BOTH FLUORESCENTS AND INCANDESCENTS!

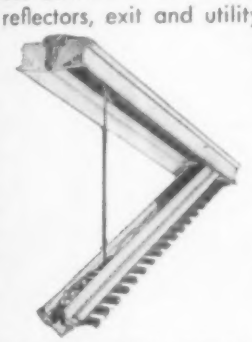
—featuring new GUTH 4-FT. SLIMLINE SYSTEM available in every GUTH fluorescent fixture

- no starters or starter troubles!
- easy to handle Single-Pin lamps!
- light in two steps almost instantly!

When you specify GUTH Luminaires you get the benefit of more than a half-century's experience in pioneering better lighting. We make good specialized equipment for every lighting need—all *precision-planned* for economical installation and maintenance:

FLUORESCENT: Commercial and Industrial; Glass diffused, Eggcrate shielded, totally indirect, luminous indirect, recessed troffers and exposed lamp types.

INCANDESCENT: Commercial and Industrial; Indirect, direct and semi-indirect types; also high bay reflectors, exit and utility lighting units.



GUTHLITE* — the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 865-X.



"V" CORRIDOR UNIT—with GrateLite** Louver-Diffuser. Fills wide hallways and corridors with practical, wall-to-wall light. Lamps shielded by easily maintained GrateLite. Models: 4′ & 8′ for 1 or 2 lamps.

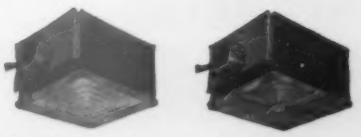
*Ⓡ **U.S. & Can. Pats. Pend. TM. Reg.



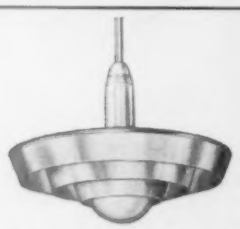
WYTE-LINER—white inside and outside (takes gloom off ceiling). AIRFLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48-X.



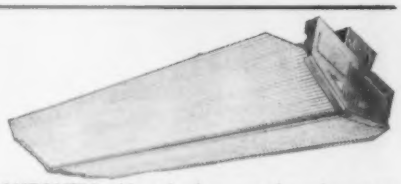
"LITE-BLOX" RECESSED TROFFERS—for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0″; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK reflectors if desired. Bulletin 869-X.



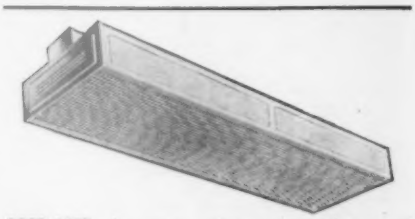
"ALL-SQUARE"—for recessing. One-piece die-cast frame. Light-leakproof. Widespread or concentrating lens—sizes 6½″ sq., 8″ sq. & 12″ sq. PRE-WIRED. Removable top and drop hinge bottom for servicing from above or below. Catalog 49-X.



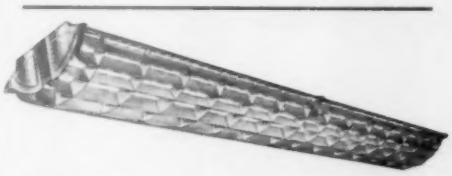
SEELUX*—totally indirect open bottom Luminaire for Silver Bowl Lamps, with modern ALZAK concentric louvers; for stem suspension or close mounting. Bulletin 864-X.



ARISTOLITE*—hinged glass panels swing open for easy cleaning from floor with handy servicing tool. Also with center Eggcrate louvers. For 2, 3 or 4 40-watt or 2 or 4 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Write for Bulletins 812-X and 820-X.



PEER-LITE—the new, ultra-modern fixture offering great flexibility. Forms any pattern—T, H, □, +, I. 20% uplight. Top plates available for 100% downlight. For 2, 3 or 4 lamps—4′ or 8′ long. Supplied with any type of louver or glass diffuser you wish. (Shown with new *GrateLite*** Louver-Diffuser.) Bulletin 900-X.



TRUCOLITE*—versatile, highly efficient, semi-direct type; can be used open, with Eggcrate louvers or diffusing glass bottom. For 2, 3 and 4 40-watt lamps—also 2 and 4 4-ft. or 8-ft. SLIMLINE lamps. Ceiling or suspension, unit or continuous mounting. Bulletins 814-X and 852-X.

GENERAL LIGHTING COMPANY, INC.

248 McKibbin Street, Brooklyn 6, N. Y.

Harry Handler, President



901 One Piece Construction Specified by N.Y.C. Housing Authority. Sprayed color. Up to 100 W. Lamp.



902 Two Ring Fixture. Oyster White, aluminum stem and canopy. Up to 200 Watt Silver Bowl Lamp.



903 Three Ring Fixture. Oyster White aluminum stem and canopy. Up to 500 Watt Silver Bowl Lamp.



904 Three Ring Pendant Fixture. Oyster White aluminum stem and canopy. Up to 500 Watt Silver Bowl Lamp.

SEND FOR COMPLETE CATALOG WITH COLOR CHART ILLUSTRATING OVER 400



Recessed Square Lens Fixtures
908— 6″ Sq. Lens, 100W.
909— 8″ Sq. Lens, 150W.
910—12″ Sq. Lens, 300W.
With spread fresnel lens. Hinged door and trim in baked-on white finish.

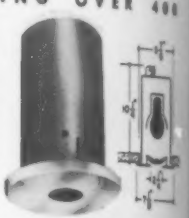


Recessed RoundLens Fixtures
911— 6″ Round Lens, 100W.
912— 8″ Round Lens, 150W.
913—12″ Round Lens, 300W.
Wide spread fresnel lens. Baked on white enamel door.



Recessed Baffled Downlight.
914 for R-40/PAR 38—150W. Projector lamp.
12″ Deep—8″ Dia.

915 for R-52 500 or 750W. Projector Lamp.
18″ Deep—11″ Dia.
For use in high ceilings.



Recessed Fixture
916 Adjustable Focus Lens Fixture. Door sprayed White Enamel finish. Use up to 100 Watt lamp.

ALL FIXTURES ARE AVAILABLE IN COLOR FROM A SELECTION OF 28 COLORS AND WITH



919 Chandelier Brass with Mobiles—3-100 Watt lamps. 36″ Wide, 36″ Long. Our custom shop will manufacture to your specifications.



920 Dome Lights up to 72″ Diameter. Send for special dome light catalog.



921 Twin Ceiling or Wall Mounting fixture with Universal Swivel Joints. Aluminum or color. Use up to 150 Watt Reflector lamps.



922 Ceiling mounted fixture with Universal Swivel. Any length stem can be supplied. Aluminum or color finish. Use up to 150 Watt Reflector lamp.

SEND FOR COMPLETE CATALOG WITH LIGHTING FIXTURES AND CHANDELIERS



925 Floor lamp with Universal Swivel at lamp housing. Aluminum or color with brass stem. Up to 150 Watt lamp.



926 Table lamp with three multi-directional swivels.

Provision for bolting to table or desk. Up to 75 Watt lamp.



927 Wall lamp—up and down light—Glass and Metal cones. 3-way switch. Metal parts in Brushed Aluminum or color. Use up to two 50W. lamps.



928 Wall mounted fixture with flexible arm and Universal Swivel. Brushed aluminum or color. Up to 75 Watt lamp.

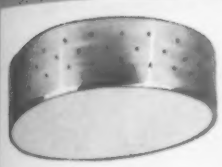
GENERAL LIGHTING COMPANY, INC.

248 McKibbin Street, Brooklyn 6, N. Y.

Harry Handler, President

General Lighting Company

LIGHTING FIXTURES AND CHANDELIERS



905 Surface mounted Perforated Fluorescent Drum With Opal Glass. Economy of operation and long life are inherent in this fixture where 24 hours a day light is required. For use with 22 Watt Circline Fluorescent lamp.



906 10" Dia. Glass Diffusing Globe

907 12" Dia. Globe. Metal Parts in Brass or Aluminum.
Up to 2-40 W. in 10" Dia.
Up to 2-60 W. in 12" Dia.



Recessed Adjustable Fixture
917 Rotobeam 350° Horizontal adjustment, 45° Vertical adjustment. For use with 150 Watt Reflector lamps.



Semi-Recessed Adjustable Fixture
918 Eye Ball Action – 360° Horizontal adjustment, 45° Vertical adjustment. Baked White trim, Satin Chrome Ball. For use with 150 Watt PAR 38 Reflector lamp.

OR WITHOUT DECORATIVE PERFORATIONS



923 Ceiling or Wall mounted fixture with Universal Swivel. Aluminum or color finish. Use up to 150W. Reflector lamp.



924 Wall or Ceiling mounted fixture with Universal Swivel. Aluminum or color finish. Use up to 150W. Reflector lamp.

Lamp and color filters available for most fixtures. For other lamp fitting shapes send for catalog.



929—from 75 Watt R-30 to 500 Watt R-40 lamps.



930 300 Watt floor or Spot PAR-56 Watt lamps.

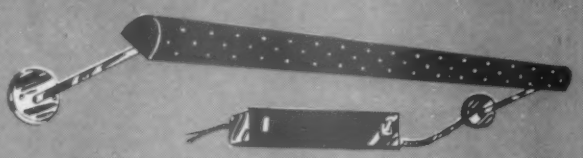


931 150 Watt R-40.

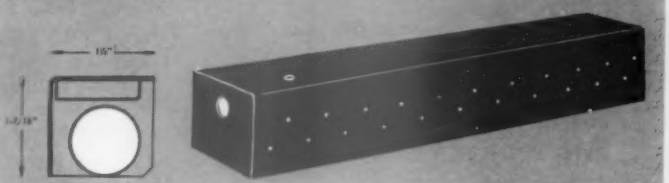


932 Universal Swivel with porcelain socket 75W. R-30 to 500W. R-40.

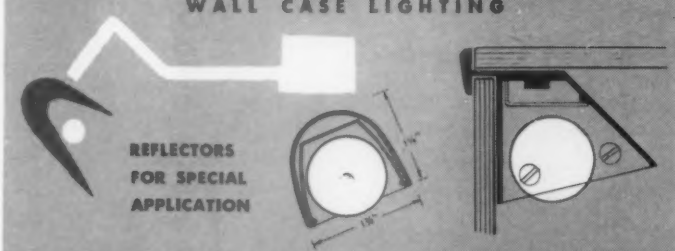
SHOWCASE AND DISPLAY FIXTURES



BULLETIN BOARD LIGHTS



WALL CASE LIGHTING



REFLECTORS FOR SPECIAL APPLICATION

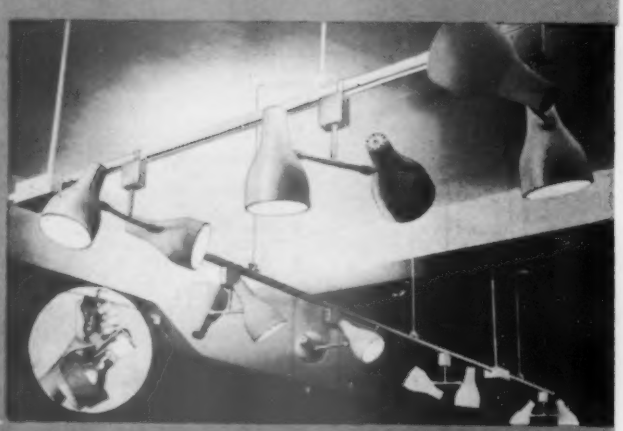
SHOWCASE REFLECTORS

Functional and decorative lighting for showcases, wall cases, display boards, picture frames, wall, ceiling and many other applications.

All fixtures available in stainless steel, natural bronze or color,, with or without decorative perforations—Reflectors are made in all sizes fluorescent, slimline 6" to 96" lamps and in incandescent, and combination of sizes.

SEND FOR ARTCRAFT CATALOG

ARTCRAFT LIGHTING COMPANY, INC.
BOX 26—248 McKIBBIN ST., BROOKLYN 6, N. Y.



Trol-E-Duct Fixtures—For use in stage lighting, library stock lighting, art class and wherever flexible lighting arrangements are desirable.

HOLOPHANE COMPANY, INC.

342 Madison Avenue, New York 17, N. Y.

2 IMPORTANT BOOKS on SCHOOL LIGHTING

Available without charge!



In these Books Holophane Engineers Indicate the Best Methods for Lighting Modern Schools . . .

Techniques in educational lighting have advanced tremendously in the last decade . . . Holophane Lighting Research has pioneered many of the new developments . . . These two vital books completely cover every phase of institutional lighting, indicating the latest practices for effective economical illumination. They are replete with engineering specifications and recommendations to assure the best installations throughout all school areas. Everyone who is responsible for school construction or remodeling — educational executives, architects or engineers — will want these books . . . Available on request without charge.

Authoritative LIGHTING DATA on All School Areas, including:

- Chapels
- Storage Space
- Laundries
- Libraries
- Music Rooms
- Art Rooms
- Drafting Rooms
- Library Stacks
- Theatres
- Kitchens
- Swimming Pools
- Laboratories
- Medical Rooms
- Auditoriums
- Corridors
- Gymnasiums
- Cafeterias
- Blackboards
- Work Shops
- Outdoor Areas
- Stair Areas
- Dining Rooms
- Study Halls
- Kindergartens
- Administrative Offices
- Classrooms

Holophane Trade Mark

Holophane means VISIBILITY with COMFORT

THERE IS A HOLOPHANE LIGHTING UNIT FOR EVERY SCHOOL LIGHTING NEED

HOLOPHANE COMPANY, INC.



Classrooms (Fluorescent)

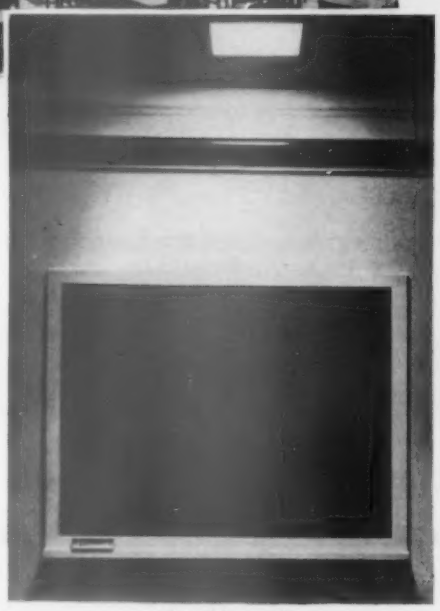


Classrooms (Incandescent)

HOLOPHANE Planned LIGHTING

For Every Scholastic Activity

Holophane has the experience and the know-how to provide the best in illumination for every scholastic activity. Better lighting means better vision, greater safety and increased efficiency for both pupils and teachers. Holophane has engineered a specific unit for each work or play area in the modern school or college . . . The Holophane Engineering Staff invites consultation, without obligation, regarding any school lighting plan.



Blackboards



Gymnasiums



Corridors



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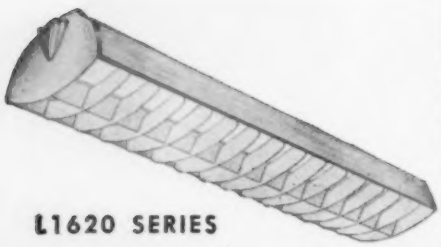
HOLOPHANE COMPANY, INC.

Lighting Authorities Since 1898 • 342 MADISON AVENUE, NEW YORK 17, N.Y.

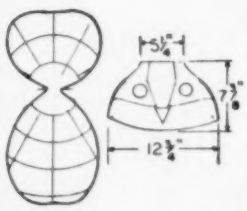
THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

SUNBEAM LIGHTING COMPANY

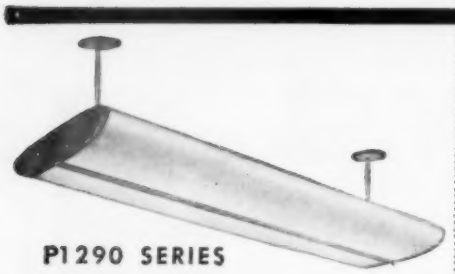
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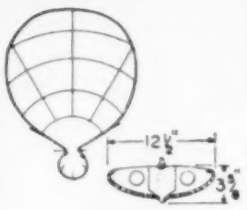
L1620 SERIES



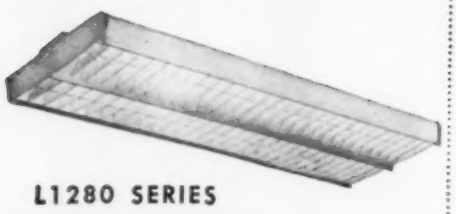
For long term economy in classroom lighting, especially where efficiency and minimum maintenance are prerequisite factors, this is the luminaire to specify. Finished in all white baked enamel, this 2-lamp unit is equipped with translucent plastic side panels. Metal louver swings open from either side for easy access to lamps. Efficiency: 85.0% and shielding of 35° by 35° is better than most school requirements. Available for 40W fluorescent, 48", 72" and 96" slimline. Also available with metal side panels (silvertone finish) as L1600 series.



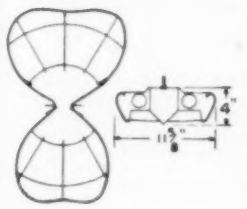
P1290 SERIES



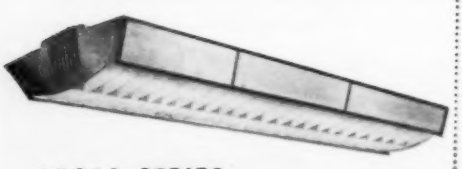
This new, very shallow, luminous, semi-direct luminaire provides the ultimate in modern lighting and visual comfort. Having exceptionally low, uniform brightness (less than 0.48 C/sq. in., 2-lamp unit), this fixture is especially designed to reduce ceiling-fixture contrasts to minimum and provide glareless illumination. Only 3⅝" deep, finished in all white baked enamel, with translucent plastic panels. All units pendant mounted only. No extra parts for continuous runs. Available for 2 and 4-lamps, 40W fluorescent, 48", 72" and 96" slimline.



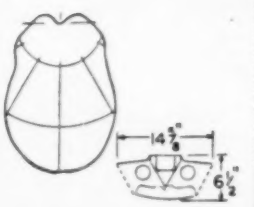
L1280 SERIES



A shallow luminaire of contemporary design incorporating many features for easy maintenance. Efficiency of 4-lamp pendant unit: 82.0% with 59.5% of light output upward and 40.5% downward. Shielding: 30° crosswise, 32° lengthwise. Designed for ceiling or pendant mounting. Finished all white baked enamel with translucent plastic side panels. One-piece louver assembly may be removed in one quick operation (even the 8-foot units) allowing easy access to lamps, ballast and wiring. Available for 2 and 4-lamp 40W fluorescent, 48", 72" and 96" slimline.



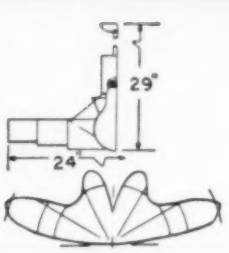
L1210 SERIES



Exceptional low, even brightness and excellent shielding makes this unit ideal for school installations. The 2-lamp unit has 45° by 45° and the 4-lamp has 36° by 45° shielding. Efficiency of 2-lamp pendant unit is 80.5% with 56% of light output upward and 44% downward. Exterior finish in silvertone, the body and louver in baked white enamel. Side panels are Corning Alba-lite glass. The louver swings open from either side for easy access to lamps and ballast channel. No extra parts for continuous runs. Available for 2 and 4-lamp 40W fluorescent and 48", 72" and 96" slimline.

2500 SERIES





Designed especially for schools where seeing task is most critical, this incandescent unit leads the country in low, even brightness within shielded zone. (Less than 0.38 C/sq. in.) Concentric louvers finished in matt white and have rolled edges for rigidity. Uniform ceiling illumination improved by upper alzak reflector. The hanger assembly contains U.L. approved wiring and the husk is finished in heat resistant silvertone paint. Available in two sizes (20" and 24" diameters) taking from 300W to 1500W Silvered-bowl lamps. Efficiency of 300/500W is 87.0%.

Units with 45° ball aligner and earthquake-proof construction also available.

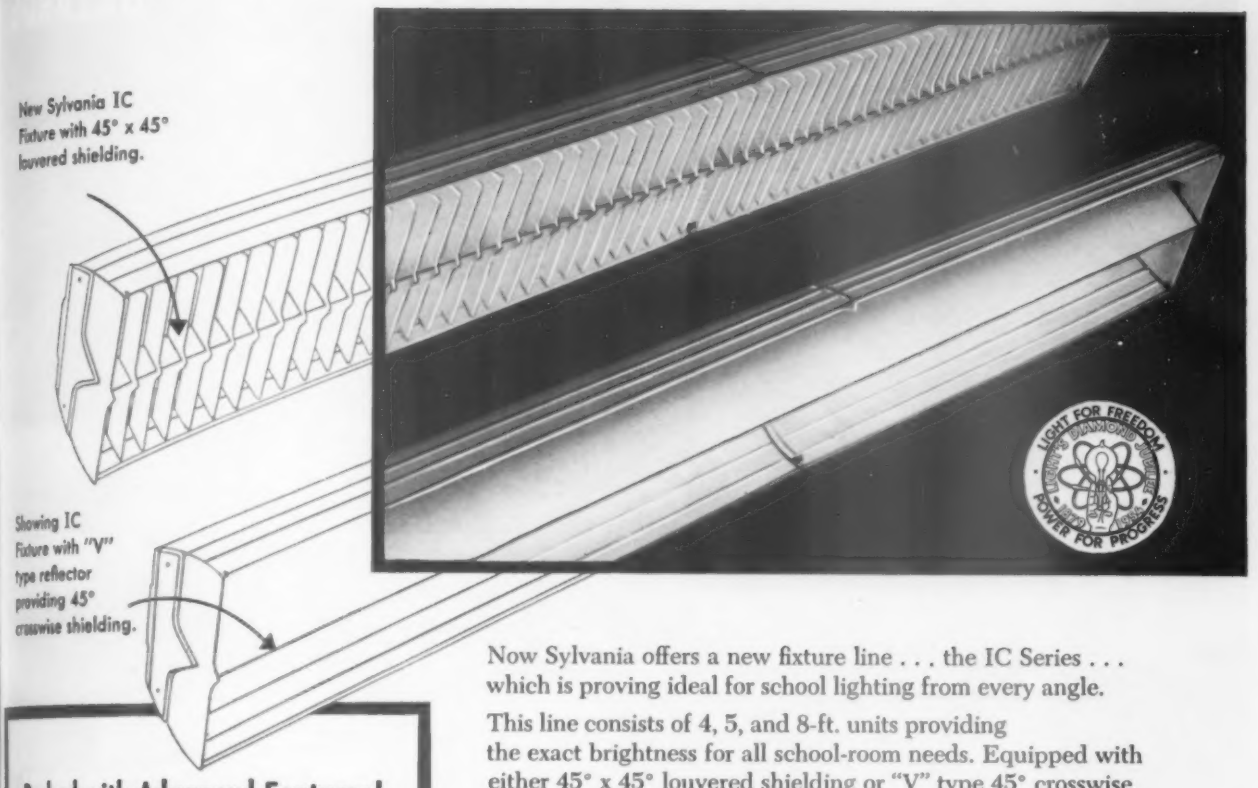
SUNBEAM Visionaire

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SYLVANIA ELECTRIC PRODUCTS, INC.

1740 Broadway, New York 19, N. Y.

Improve School Lighting...Reduce Maintenance with these efficient NEW SYLVANIA FIXTURES!



Now Sylvania offers a new fixture line . . . the IC Series . . . which is proving ideal for school lighting from every angle.

This line consists of 4, 5, and 8-ft. units providing the exact brightness for all school-room needs. Equipped with either 45° x 45° louvered shielding or "V" type 45° crosswise reflector shielding. Designed to accommodate regular fluorescent lamps or the new T-17 low-brightness lamps. Attractive in appearance and easy to install, these versatile fixtures also hold maintenance costs to the absolute minimum.

Sylvania's school lighting booklet gives full details on all fixtures recommended for school uses. Write for your copy to Dept. 4X-76, Sylvania today.



SEND FOR THIS ILLUSTRATED BOOKLET!

Packed with Advanced Features!

45° x 45° Louvered Shielding reduces direct glare to comfortable levels.

60%-40% Distribution means 60% downward lighting distribution to 40% upward . . . an extremely desirable ratio for clear, all-over lighting.

Versatile and Rugged. All 4' and 5' channels are die-formed of 20-gauge steel, with extra knockouts for flexibility of installation, in continuous rows, pendant or surface mounting. All 8' channels are die-formed of *18 gauge steel* to provide greater rigidity in these longer lengths—*another Sylvania extra!* Metal parts Bonderite treated to resist deterioration. Finished in Sylvania's baked Miracoat, providing 86% reflectivity.

T-17 Low Brightness Lamp may also be used in IC fixtures, thus meeting the need for minimum shielding, high efficiency and easy maintenance.

SYLVANIA

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In Canada: Sylvania Electric (Canada) Ltd.
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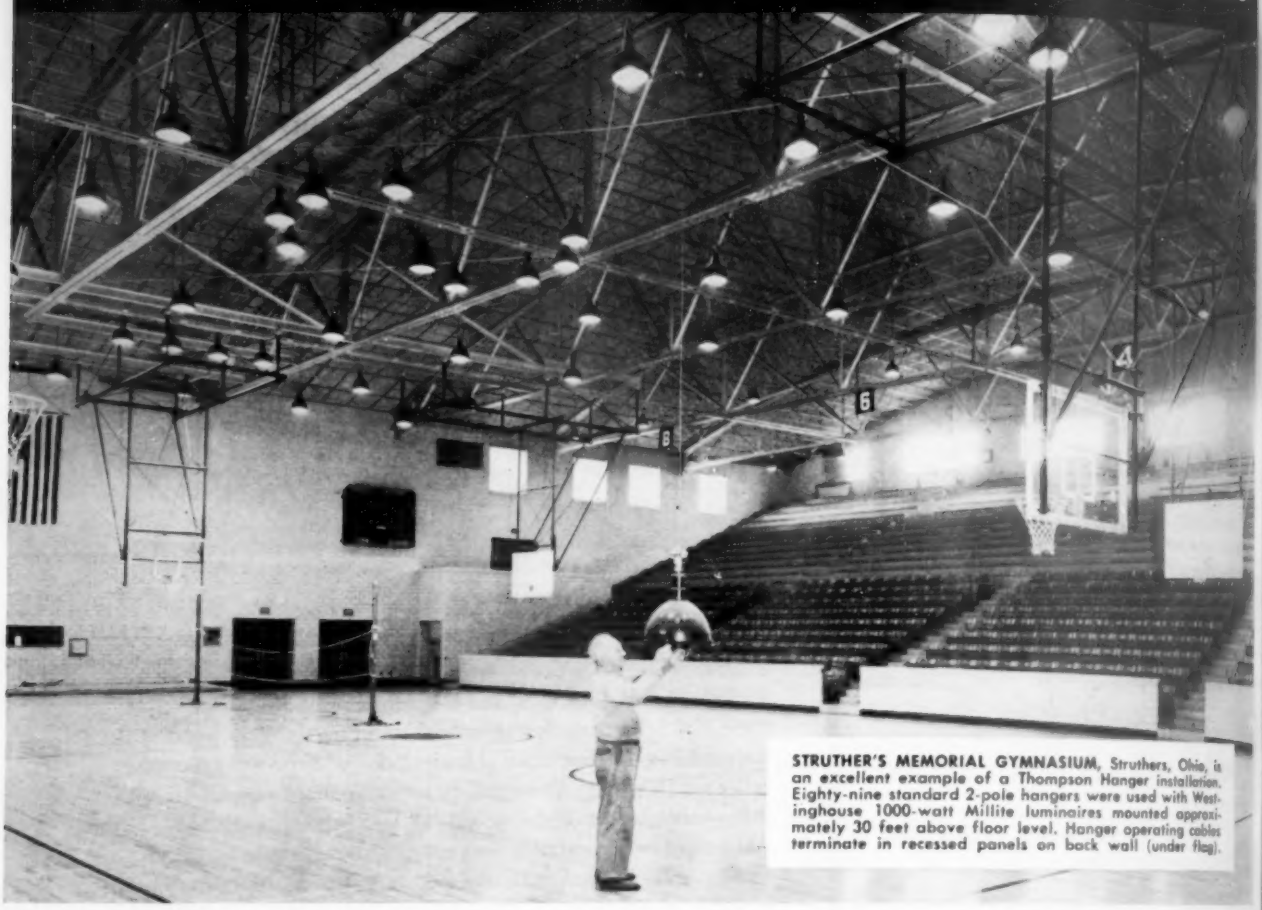
LIGHTING • RADIO • ELECTRONICS • TELEVISION

THE THOMPSON ELECTRIC COMPANY

1111 Power Avenue, Cleveland 14, Ohio, U. S. A.

THOMPSON DISCONNECTING AND LOWERING HANGERS

LOWER LIGHTS AND COSTS . . . REDUCE SERVICING HAZARDS



STRUTHER'S MEMORIAL GYMNASIUM, Struthers, Ohio, is an excellent example of a Thompson Hanger installation. Eighty-nine standard 2-pole hangers were used with Westinghouse 1000-watt Millite luminaires mounted approximately 30 feet above floor level. Hanger operating cables terminate in recessed panels on back wall (under flag).

Maximum lighting efficiency can be maintained easily and economically when **THOMPSON HANGERS** are installed. Because the luminaires are lowered to the maintenance man, servicing is accomplished quickly and safely at floor level. In addition, all electrical hazards are eliminated . . . the lowered light fixture is "dead" (live contacts remain overhead).

INDOOR and **OUTDOOR** models of **THOMPSON HANGERS** are available for use with overhead lights located 16 feet or more above floor or ground level, and they can be used with almost any type of lighting fixture. **RECOMMENDED APPLICATIONS:** gymnasiums, swimming pools, field houses, athletic fields, yard lights and many other similar installations.



WRITE FOR BULLETIN TH-52 FOR ADDITIONAL DETAILS. Address all inquiries to Educational Building Department

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The superior characteristics of Exide batteries are absolute dependability, low maintenance and sustained high voltage until end of discharge. Complete flexibility of operation is possible due to a wide range of discharge rates at any desired voltage. By assigning a group of cells of the battery to a definite experiment, a constant voltage is assured which is free from disturbance or interference by any outside influence.

Exide batteries of the sealed glass or plastic jar type have been carefully designed and constructed for laboratory service. They assure exceptional long life in any application. Many Exide batteries in laboratory and industrial installations have been in constant use for 20 or more years.

Regardless of how limited your budget appropriation, an Exide Battery can be selected to meet your requirements. Moreover, the wide experience of Exide engineers and the services of our nationwide Exide organization are at your disposal.

Write to the nearest Exide office shown above for further information.

EXIDE EMERGENCY LIGHTING

Positive Protection Against Dangers of Sudden Lighting Failures

Whether children or adults, you can never predict the actions of a crowd that is suddenly plunged into darkness. Danger is real. Danger of personal injury . . . danger to school property.

In spite of the precautions taken by utility companies, power interruptions do occur. Electrical engineers agree that the only certain safeguard is a storage battery powered emergency lighting system that functions both *instantly and automatically.* Exide Emergency Lighting equipment meets these requirements. Exide glass or plastic container batteries are automatically kept fully charged and ready at all times.

Many thousands of long life Exide batteries have been placed into emergency service by schools, public and private institutions, telephone, railroad and public utility companies and in all kinds of buildings since 1895.

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Automatic 32-Volt Transfer Switch Charger and Transporter



Adequate emergency lighting protection for periods up to 8 hours is possible with the self-contained Unit. Automatically provides instantaneous emergency lighting protection. Minimum maintenance—UL approved.

115-Volt Automatic Charge Control Unit

115-Volt Automatic Transfer Switch Unit



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An all-inclusive electrical supply service for schools and universities

Through its nation-wide network of warehouses and offices, GRAYBAR distributes the products of more than 200 of the nation's leading manufacturers of electrical equipment and supplies. Its services are based on 84 years of experience in the electrical field.

Experienced GRAYBAR Representatives and equipment Specialists perform many useful functions for the school superintendent, school architect, the electrical contractor, and the buyer of electrical maintenance supplies—going far beyond mere "order-taking."



Aid in Electrical Planning

GRAYBAR is fully informed on modern equipment for school lighting, communication, signaling and alarm systems. Specialists familiar with school installations in many communities will advise on choice of equipment and planning of the system you desire.



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From a near-by GRAYBAR warehouse you can order a wide variety of electrical items – a fact that's particularly helpful in emergencies and often saves valuable time even on everyday requirements.

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Owensville, Indiana

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for YOUR School—at Low Cost!

Eliminate Costly, Undependable Manual Systems . . . Replace Unreliable Program Clocks . . .



with NEW MODEL

Montgomery PROGRAM CLOCKS

Fully Automatic—Trouble Free!

- **Program schedules easily set up or changed as desired.**
- **Signal duration adjustable from 4 to 20 seconds.**
- **Models for either 12 or 24 hour operation.**
- **Automatic calendar switch silences signals any desired days or nights.**
- **Resetting clock does not disturb pre-set program schedule.**
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- **Attractive formed steel case in gray metalescent baked enamel blends with any decorative scheme.**

New, Improved Models M and L Meet Nearly Every Classroom Need!

More accurate signal duration! Stronger construction! Individual calendar switch controls on each circuit of Models L-12 and L-24! No price increase!

MONTGOMERY MODEL M-12—SINGLE CIRCUIT
12-hr. schedule, day hours. Rings bells at any multiple of 2½ minutes. Price $86.25.

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24-hr. schedule, day or night. Rings bells at any multiple of 5 minutes. Price $86.25.

MONTGOMERY MODEL L-12—TWO CIRCUITS
12-hr., days. Rings two separate groups of bells independently at 2½-min. multiples. Price $116.50.

MONTGOMERY MODEL L-24—TWO CIRCUITS
24-hr., day or night. Rings two separate groups of bells at any multiple of 5 min. Price $116.50.

ALL ACCESSORIES AVAILABLE
We can furnish transformers, bells, buzzers, horns and other accessories if you need a complete signal system—all designed to operate perfectly with Montgomery Program Clocks. See your dealer or write for information.

Larger Clocks, With More Circuits, Ready in July

If your school needs a multi-circuit timer, the new, larger, Montgomery Program Clock is just what you're looking for!

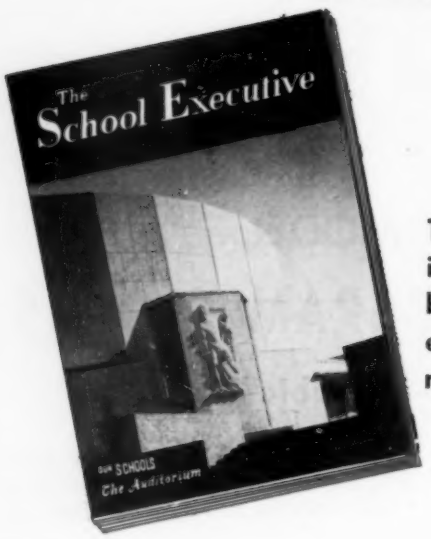
Available about July 1, 1954, this new Montgomery Clock will handle up to 8 individual circuits. Each circuit has its own individual calendar switch to provide almost unlimited program flexibility.

This handsome new model is about 22 inches high, 14 inches wide, 9 inches deep. Clock face is 9 inches in diameter, with large numerals. Entire mechanism swings out . . . easy to set or change schedules.

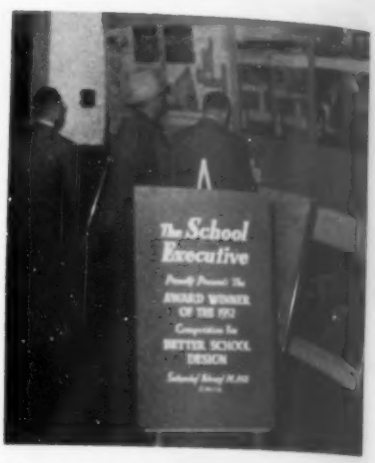
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THE SCHOOL EXECUTIVE
470 Fourth Avenue, New York 16, N. Y.

Annual Competition for Better School Design



To encourage creative thinking in the design of new school buildings to more fully serve educational and community needs.







Each spring architectural firms in the United States and Canada are invited to submit entries of their new schools in The School Executive Annual Better School Design Competition. All entries for the calendar year must be received by December 15th of that year. The closing date for submitting entry materials is one month later, January 15th.

The entries are judged by a panel of five judges including three architects, a school plant specialist and a superintendent of schools. Bronze plaques are awarded to the five winning entries. Honorable mention entries receive citation scrolls.

The award winners are announced at the American Association of School Administrators Convention in February and their entries are exhibited at that meeting.

Detailed descriptions of the award winning buildings are featured in The School Executive together with the jury report on the competition. This is one of the ways by which The School Executive locates and makes available to its readers the best work that is being done in school plant planning.

In every issue the editors of The School Executive provide material to help school administrators and architects plan and build better schools. Its "Schools in Action" section reports examples of good school design. "Educational Planning" studies deal with the various school programs to be housed and the facilities required for them. "School Equipment News" section keeps school men and architects abreast of new materials, furniture and equipment as they become available.

Subscription rates: One year $4.00; Two years $6.00.

IBM
TRADE MARK

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ELECTRONIC and ELECTRIC TIME and PROGRAM SIGNALING CONTROL SYSTEMS

IBM ELECTRONIC and ELECTRIC SELF-REGULATING TIME and SIGNALING SYSTEMS are designed to maintain accurate and uniform time in all clocks, time signals, and time recorders. The master control is the "director" of each system, supervising all time units and automatically correcting those units which, when temporary power outages occur, do not agree with the master. The three types of IBM self-regulating time and program signaling systems are:

THE ELECTRONIC SYSTEM operates over regular AC lighting wires. *No special wiring* is required to control and automatically correct, if necessary, time and signaling units in this system. Uniform time is maintained in all clocks, time signals and time recorders by the automatic transmission of high frequency pulses superimposed on the lighting wires.

THE SYNCHRONOUS, WIRED SYSTEM operates on regular AC lighting wires. Automatic correction of units at variance with the master's time is accomplished through a separate circuit of wires connecting the master control and secondary units. As in the electronic system, uniform time is maintained automatically in all time units in this system.

THE MINUTE IMPULSE, WIRED SYSTEM is designed for operation and automatic regulation of all clocks, signals, and time recorders over circuits of control wires connecting the master and secondary units. Uniform time is maintained automatically to the minute in all secondary units by transmission of impulses over the control wires.



MASTER CLOCKS



MASTER TIME and PROGRAM CONTROLS



BELLS



WALL CLOCKS



MODERN SQUARE CLOCKS



DOUBLE DIAL CLOCKS

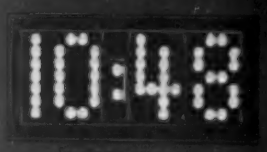
TOWER CLOCKS, OUTDOOR CLOCKS, INTERIOR CLOCKS

IBM CLOCKS are manufactured in a variety of types and sizes . . . from tower clocks to standard and specially designed indoor and outdoor clocks. These clocks serve not only as basic time-pieces, but also as distinctive complements to buildings' architecture.

To assure their consistently dependable operation, these clocks are operated from IBM self-regulating master time controls. AC or DC operation is optional.

In addition to complete tower clocks, IBM manufactures movements and dial works of fine quality workmanship which may be installed as components of clocks planned for new installation or modernization of existing installations.

DIRECT READ TIME FLASHERS similar to that shown at the right are "landmarks of time" on many office and industrial buildings. IBM will provide flasher banks, relays, and all necessary time controls for this type of installation.



DIRECT READ FLASHER CLOCKS



TOWER CLOCKS



SKELETON DIAL EXECUTIVE CLOCKS

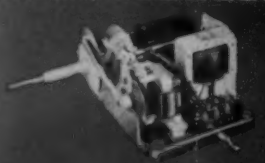
ATHLETIC SCOREBOARDS AND TIMING EQUIPMENT

IBM ELECTRIC SCOREBOARDS provide fast, accurate means of indicating the official time, score, and other pertinent facts of games. In addition to two standard basketball scoreboards, IBM builds to order complete indoor arena scoreboards for basketball, boxing, wrestling, track, hockey, and rodeo. IBM also will furnish components, such as numeral flasher banks, dial-type and direct-read timers, sideline and pressbox controls, bulls-eyes, and clock movements and dial works for all types of scoreboards including football and baseball boards to be constructed locally.

In addition, IBM will furnish necessary wiring diagrams and installation diagrams so that complete scoreboards can be designed in cooperation with local sign companies or maintenance staffs.



PRESSBOX CONTROLS



DIAL TYPE TIMER MOVEMENTS



BASKETBALL SCOREBOARDS



FULLY-AUTOMATIC ATTENDANCE RECORDERS



SEMI-AUTOMATIC TIME STAMPS



JOB COST RECORDERS



CONSECUTIVE SPACING RECORDERS



RECORDING DOOR LOCKS



FULLY-AUTOMATIC TIME STAMPS

TIME RECORDING EQUIPMENT

IBM TIME RECORDING EQUIPMENT consists of Attendance Time Recorders, Job Cost Recorders, Time Stamps, Consecutive Spacing Time Recorders, and Recording Door Locks. Each unit is designed to perform a specific function . . . to provide accurate, indelible records of performance.

ATTENDANCE TIME RECORDERS are available for AC or Master Control operation. These machines record the IN and OUT time on individual cards of personnel. In addition to recording attendance time, fully-automatic recorders will control the sounding of time signals to indicate starting and stopping times and also will control a circuit of wall clocks for coordination of time indicated with the time recorded and signaled.

JOB COST RECORDERS are available for operation from AC or a Master Control. The purpose of these machines is to provide accurately-printed records of the time jobs or operations are started and finished. The elapsed time becomes the basis of true cost figures.

CONSECUTIVE SPACING TIME RECORDERS register attendance or job time, or both, on individual cards. Each registration is spaced automatically beneath the one preceding no matter how complex the schedule or how little time has elapsed between registrations. These machines also may be equipped with a time signal control. For operation from supervised AC or Master Control.

TIME STAMPS print the year, month, date, hour, and minute of receipt and dispatch of mail, correspondence, and documents. IBM manufactures three types: a fully-automatic, electric-print time stamp which changes from day to day and month to month automatically; a semi-automatic, electric-print stamp and a semi-automatic, manual-print stamp, which require a manual type-wheel change from month to month. AC or Master Control operation.

RECORDING DOOR LOCKS provide accurately-printed records of the time doors to valuable documents, plans, stores, and others are locked and unlocked, from the inside or outside, and by whom. A tape record is available immediately by unlocking and removing the mechanism's case. AC operation only.

Interlocking door and window bolts may be added to the door lock control for a completely supervised protective system.



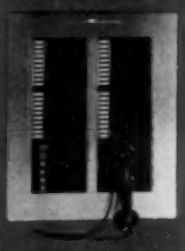
FIRE ALARM CONTROL CABINETS



FIRE ALARM SIGNAL STATIONS



TELEPHONES



TELEPHONE CONTROL PANELS

FIRE ALARM AND TELEPHONE SYSTEMS

IBM FIRE ALARM EQUIPMENT consists of alarm control cabinets, stations, and signals for the following types of fire alarm systems:

MASTER CODE, CLOSED-CIRCUIT, single or double-supervised, 1-4 signal circuits.

MASTER CODE, OPEN-CIRCUIT, non-supervised.

NON-CODE, CONTINUOUS-RINGING, closed-circuit, single-supervised 1 or 2 signal circuits.

SELECTIVE CODE, CLOSED-CIRCUIT, single or double-supervised and 1-4 signal circuits.

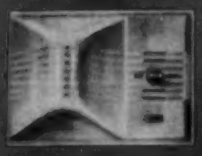
SELECTIVE CODE, PRE-SIGNAL, closed-circuit, single or double-supervised and 1-4 signal circuits.

IBM INTERCOMMUNICATING TELEPHONE EQUIPMENT is designed to provide an efficient, centrally supervised, selective ringing, common talking telephone system. Various types of IBM telephone instruments, as well as control panels, target indicators, and power units are available.





CALLING STATIONS WITH LIGHT AND EMERGENCY BUTTON



PILOT AND BUZZER STATIONS



ANNUNCIATORS

NURSES' CALL SYSTEMS

IBM NURSES' CALL SYSTEMS are modern, efficient patient-signaling systems for hospitals of every size. They consist of various types of calling stations, pilot and buzzer stations, nurses' annunciators, and call buttons.

LOCKING AND RESET CALL BUTTONS are light, balanced, and functionally designed with black shells and transparent durable plastic tops. Luminous material causes them to glow in the dark.

CALLING STATIONS consist of Momentary and Emergency Stations equipped with locking buttons mounted on wall plates; stations containing wall receptacles combined with call buttons, cords, plugs, signal lights and/or emergency buttons; and Operating Room Explosion-Proof type Calling Stations.

CORRIDOR PILOT AND BUZZER STATIONS are molded translucent domes hinged to gang plates with lamp receptacle and/or buzzers and cut-off switches.

NURSES' ANNUNCIATORS are available in the bulls-eye types for limited signal indications and the light-tight compartment types which accommodate up to 30 stations.

IBM ELECTRIC TYPEWRITERS

THE NEW IBM ELECTRIC TYPEWRITER combines all the work-saving features and improvements that only IBM's 21 full years of continuous electric typewriter leadership and research could produce. The new IBM has an exclusive cushion-quiet carriage return for quieter operation, a swift gliding carriage for faster, easier typing, and many other new and years-ahead features. The Standard IBM is a superior teaching instrument for schools because students become more proficient typists in shorter time. Many schools from coast to coast have proven in actual classroom experiments that the IBM is "The Teaching Typewriter."

THE NEW IBM EXECUTIVE ELECTRIC TYPEWRITER, with its unique proportional spacing principle, writes letters of unsurpassed beauty. And schools use the Executive Model to prepare masters for reproduction. By using the 2 and 3 unit space bars and typing twice, a typist can make even right margins for yearbooks, bulletins and other school publications.

Both the Standard and Executive models are available at special educational prices when used for instructional purposes in the school.

*Trade Mark



ELECTRIC TYPEWRITERS



ELECTRIC EXECUTIVE* TYPEWRITERS

ELECTRIC TEST SCORING MACHINES

THE IBM ELECTRIC TEST SCORING MACHINE provides an accurate means of scoring and analyzing objective examinations. Multiple-choice, matching, true-false, like-dislike, agree-disagree, and weighted item tests—all can be scored at the speed of 500-800 tests an hour regardless of whether there are 10 or 150 questions. This time-conserving machine permits a wide expansion of school testing programs.

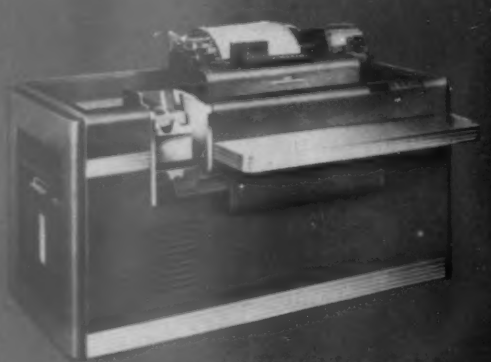
Special analyses can be obtained through the use of two attachments: the Aggregate Weighting Unit, which computes weighted averages, and the Graphic Item Counter, which counts the number of pupils who answered each question correctly or incorrectly.



TEST SCORING MACHINES

ELECTRONIC AND ELECTRIC ACCOUNTING MACHINES

IBM PUNCHED CARD ACCOUNTING MACHINES give institutional and business management a broad or detailed, current picture of any phase of operations. These machines, many of them embodying the latest principles of electronics, bring tremendous speed to the preparation of payrolls, inventory records, cost analyses, registration, administration, and statistical accounting, as well as to other accounting, statistical, and computing activities.



ACCOUNTING MACHINES

IBM

TRADE MARK

Branch Offices and Maintenance Locations

ALABAMA
Birmingham
Decatur
Gadsden
Mobile
Montgomery

ARIZONA
Phoenix
Tucson

ARKANSAS
El Dorado
Fort Smith
Little Rock
Pine Bluff

CALIFORNIA
Bakersfield
Fresno
Glendale
Long Beach
Los Angeles
Modesto
Oakland
Richmond
Riverside
Sacramento
Salinas
San Diego
San Francisco
San Jose
Santa Ana
Santa Barbara
Santa Monica
South Gate
Stockton

COLORADO
Colorado Springs
Denver
Pueblo

CONNECTICUT
Bridgeport
Hartford
New Haven
New London
Waterbury

DELAWARE
Wilmington

DISTRICT OF COLUMBIA
Washington

FLORIDA
Gainesville
Jacksonville
Miami
Orlando
Pensacola
Tallahassee
Tampa

GEORGIA
Atlanta
Augusta
Columbus
Macon
Savannah

IDAHO
Boise
Pocatello

ILLINOIS
Alton
Aurora
Bloomington
Carbondale
Champaign
Chicago
Danville
Decatur
East St. Louis
Evanston
Galesburg
Moline
Peoria
Quincy
Rockford
Springfield

INDIANA
Anderson
Columbus
Evansville
Fort Wayne
Hammond
Indianapolis
Kokomo
La Porte
Lafayette
Marion
Muncie
Richmond
South Bend
Terre Haute

IOWA
Cedar Rapids
Des Moines
Sioux City
Waterloo

KANSAS
Topeka
Wichita

KENTUCKY
Frankfort
Lexington
Louisville

LOUISIANA
Alexandria
Baton Rouge
Lafayette
Lake Charles
Monroe
New Orleans
Shreveport

MAINE
Bangor
Portland

MARYLAND
Baltimore
Cumberland
Hagerstown

MASSACHUSETTS
Boston
Fitchburg
Framingham
Lawrence
New Bedford
Pittsfield
Salem
Springfield
Worcester

MICHIGAN
Ann Arbor
Battle Creek
Dearborn
Detroit
Flint
Grand Rapids
Jackson
Kalamazoo
Lansing
Muskegon Heights
St. Joseph

MINNESOTA
Duluth
Minneapolis
St. Paul
Winona

MISSISSIPPI
Jackson
Laurel
Meridian

MISSOURI
Jefferson City
Joplin
Kansas City
St. Louis
St. Joseph
Springfield

MONTANA
Billings
Butte
Great Falls
Helena

NEBRASKA
Lincoln
North Platte
Omaha

NEVADA
Las Vegas
Reno

NEW HAMPSHIRE
Concord
Manchester

NEW JERSEY
Camden
Elizabeth
Jersey City
Newark
Paterson
Trenton

NEW MEXICO
Albuquerque
Los Alamos

NEW YORK
Albany
Brooklyn
Bronx
Buffalo
Elmira
Endicott
Garden City
Ithaca
Jamestown
New York
Olean
Poughkeepsie
Queens
Rochester
Schenectady
Syracuse
Utica
Watertown
White Plains

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Asheville
Burlington
Charlotte
Durham
Greensboro
Raleigh
Wilmington
Winston-Salem

NORTH DAKOTA
Bismarck
Fargo

OHIO
Akron
Canton
Cincinnati
Cleveland
Columbus
Dayton
Findlay
Lima
Lorain
Mansfield
Painesville
Springfield
Toledo
Youngstown
Zanesville

OKLAHOMA
Oklahoma City
Tulsa

OREGON
Eugene
Medford
Portland
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PENNSYLVANIA
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Bethlehem
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Johnstown
Lancaster
New Castle
Oil City
Philadelphia
Pittsburgh
Reading
Scranton
Sharon
Williamsport
York

RHODE ISLAND
Providence

SOUTH CAROLINA
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Columbia
Greenville
Greenwood
Spartanburg

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Pierre
Rapid City
Sioux Falls

TENNESSEE
Chattanooga
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WASHINGTON
Olympia
Pullman
Richland
Seattle
Spokane
Tacoma

WEST VIRGINIA
Charleston
Clarksburg
Huntington
Parkersburg
Wheeling

WISCONSIN
Appleton
Eau Claire
Fond du Lac
Green Bay
La Crosse
Madison
Milwaukee
Neenah
Racine
Sheboygan
Wausau

WYOMING
Casper
Cheyenne

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 Madison Ave., New York 22, N.Y.

C 9/2



SYNCHRONOUS MOTOR

CLOCK and PROGRAM SYSTEM

• TYPE GR •



The STANDARD ELECTRIC TIME Company

SPRINGFIELD, MASSACHUSETTS • MONTREAL, QUEBEC

STANDARD

TYPE GR SYNCHRONOUS MOTOR

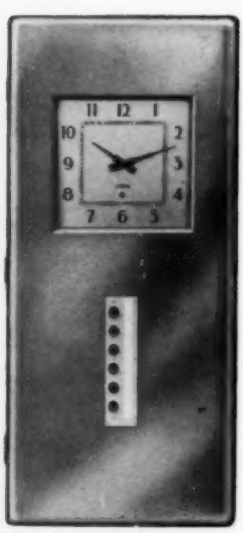
FOREWORD

Any item of equipment such as an electric clock and program system performing a constant service every minute, year in and year out, must of necessity be simple in design with as few moving parts as possible. The Company has followed this practice since its inception in 1884 and the system described here reflects this sound policy. It requires the very minimum of care and attention.

GENERAL DESCRIPTION

The "STANDARD" GR clock and program system is of the dual motor, individually reset type. It runs directly from the 120V 60 cycle building current without the use of batteries or rectifiers. During current interruptions the secondary clocks will stop, but the Master-Controller has a reserve device which keeps it running on time for at least 12 hours. This permits the bells to ring on normal schedule with no false signals **immediately** the current is resumed.

After the current comes on, the secondary clocks will be automatically advanced by their resetting motors at 120 times normal speed. All synchronous motors tend to "coast" when the current fails and for different amounts of time. After several such power failures the clocks are scattered and will show different times. The "STANDARD" system prevents this since each individual clock, including the sweep second hand, is automatically reset to agree exactly with the Master Controller.



master-program controller

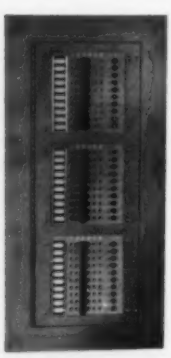
This unit has a 120V a-c heavy duty, slow speed, long life industrial type, synchronous motor which drives a 2, 4 or 6 circuit (schedule) program mechanism. This is directly geared to a 10" clock dial on the front, thus keeping the time dial and program always the same.

The program device is of the minute interval type, 12 or 24 hours duration as required, has automatic signal silencing device and is absolutely quiet in operation.

The controller automatically advances the secondary clocks to compensate for current failures up to 59 minutes. A switch is provided in the case to use for periods over 59 minutes.

Cases can be furnished for surface or flush mounting as required, and they are finished in #607 art metal gray.

List No. Surface	List No. Flush	No. of Circuits
12GR	12GR-F	2
14GR	14GR-F	4
16GR	16GR-F	6



bell control board

These are furnished in 10-unit, dead front, sections and provided with screw plug, push button and card holder for each signal. They are made for either a-c or d-c signals up to 115V. The entire front opens on a piano hinge giving easy access for making wire connections.

The section panels are of gray laminated plastic with engraved circuit numbers. The trim is finished in #607 art metal gray.

List No. Surface	No. of Signals	List No. Flush	Dimensions Flush Type
K-20-D-6	20	K-20-D-6-F	9⅝ x 20¼
K-30-D-6	30	K-30-D-6-F	9⅝ x 20¼
K-40-D-6	40	K-40-D-6-F	17 x 20¼
K-50-D-6	50	K-50-D-6-F	17 x 20¼
K-60-D-6	60	K-60-D-6-F	16 x 20¼

These boards may be converted to a central telephone station using one section and providing a master handset telephone, switch, relay and buzzer.

One section may also be supplied with a master push button and separate buttons for each circuit.

secondary clocks

Secondary clocks have two 120V a-c slow speed, long life, synchronous motors. One motor operates the clock at normal speed, while the other is used to advance the hands, including the sweep second hand, after current interruptions, at 120 times the normal speed. This resetting is controlled automatically from the Master Controller. Each clock is of simplified design with a minimum of moving parts and with all contacts and complicated adjustments eliminated. This means lower initial and maintenance costs.
The cases are finished in #404 satin aluminum. Dials are satin aluminum with black figures. Skeleton dials finished in light bronze.



weatherproof flush clock

This clock shown at the left is the most practical one for outdoor use where flush mounted type is required. It is thoroughly weatherproof, has a heavy plate glass storm front, white translucent plastic dial with raised black numerals.

From 6 to 12 lamp receptacles (depending on size of clock) are mounted back of dial for illumination purposes.

List No. 524-GR	24″ wall opening.
List No. 536-GR	36″ wall opening.
List No. 548-GR	48″ wall opening.



Flush Type Clock

List FMT-10GR	10″ Dial
List FMT-12GR	12″ Dial
List FMT-16GR	16″ Dial



Gymnasium Clock Guard
List No. GCG for 12″ or 16″ Clock



Skelton Dial

List SK-435-12GR	12″ Dial
List SK-435-16GR	16″ Dial
List SK-435-24GR	24″ Dial
List SK-435-36GR	36″ Dial
List SK-435-48GR	48″ Dial



Double Dial Clock

List DM-12-GR	12″ Dials
List DM-16-GR	16″ Dials



Surface Type Clock

List RMT-12GR	12″ Dial
List RMT-16GR	16″ Dial



Skelton Dial

List SK-436-12GR	12″ Dial
List SK-436-16GR	16″ Dial
List SK-436-24GR	24″ Dial
List SK-436-36GR	36″ Dial
List SK-436-48GR	48″ Dial

program signals

These generally consist of buzzers mounted inside the secondary clocks for the classroom, 6″ bells in corridors and 10″ gongs or horns for outside.



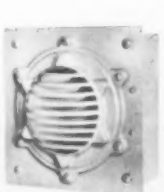
6″ Corridor Bell
List No. MAJ-6

10″ Outside Gong with Grid
List No. UA-10-G





Flush Horn
List No. F30B



Surface Mounted Horn
List No. 30A



Single Projector Horn
List No. 30



Double Projector Horn
List No. 50

STANDARD

TYPICAL JOB SPECIFICATIONS

CLOCK AND PROGRAM SYSTEM

Furnish and install a synchronous motor, automatic reset electric clock and program system including a master-program controller signals, bell control board and secondary clocks. The equipment to be that of The Standard Electric Time Co. or approved equal. Their list numbers are used as a basis of quality and requirements.

Master-Program Controller

This shall be a List No. (14GR-F) operated by a 120V a-c slow speed, synchronous motor driving a (4) circuit, (12) hour, minute interval program mechanism geared to a 10" clock dial on front. The controller shall have a spring reserve device to maintain accurate operation during current interruptions totaling at least 12 hours. The controller shall automatically reset all secondary clocks after current interruptions up to 59 minutes; a manual switch to cover longer periods of time shall be provided.

Secondary Clocks

Unless otherwise specified these shall be 12" List FMT-12-GR flush type, with two synchronous motors. One motor to drive clock at normal speed and the other to reset the hands, including the sweep second hand, after current interruptions, at 120 times normal speed. All clocks shall be individually reset to compensate for discrepancies between them. The cases to be finished in #404 satin aluminum.

Options:

(a) The auditorium clock to be 16" — List FMT-16-GR.

(b) The gymnasium clock to be 16" — List RMT-16-GR with wire guard.

(c) Install (12") double dial clocks for sidewall (ceiling) mounting where shown on drawings.

Program Signals

Classroom (and auditorium) clocks shall be provided with List MA buzzers. Corridor (gymnasium, cafeteria) bells shall be 6" List MAJ-6. Outside gongs shall be List UA-10-G 10" weatherproof with cast metal grid. All signals shall be for operation on (24V) (120V) a-c.

Option if Desired:

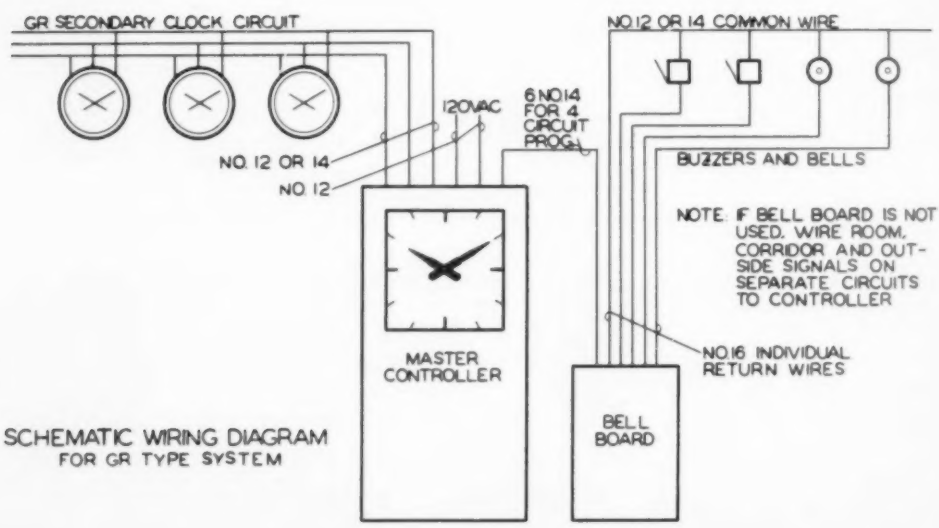
Horns may be used in lieu of gongs for outside if desired — use list numbers as given.

Bell Control Board

Install a flush (surface) mounted, 6 circuit, dead front, bell control board with plugs, push buttons and card holders for (20) (30) (40) (etc.) signals so any signal may be transferred to any program schedule; provide a push button for each signal so it may be operated manually when desired.

Wiring and Installation

In general the wiring shall consist of: 3 wires No. 12 (14) for the secondary clock circuits; the signals shall have a #12 (14) common wire with a separate #16 return from each to the bell board. Provide a 120V a-c unswitched circuit to controller. All wiring and installation shall be done in accordance with the manufacturer's instructions.



SCHEMATIC WIRING DIAGRAM
FOR GR TYPE SYSTEM

PRINTED IN U.S.A.

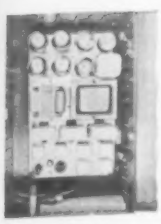
STANDARD **THE STANDARD ELECTRIC TIME COMPANY**
Factories: Springfield, Mass. 89 Logan St.
Montreal, Que. 726 St. Felix St.

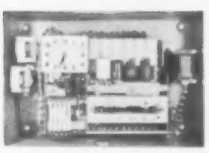
Simplex master clock and program systems

. . . your choice of 5 systems

electronic master system, no. 1


Master Clock


Transmitter


Program Unit


Signals


Racks


Payroll Recorder


Racks


Secondary Clock


Cost Recorder

The electronic control and operation of clocks and program signals by means of a carrier current signal is the same method used for many years by Public Utilities to operate remote relays, turn on and off heaters and street lights.

The basic principle of this type of system is the superimposing of a high frequency signal on existing power lines and providing units called receivers to respond to this signal.

The application of the principle to the Simplex electronic clock system is straightforward and simple. A unit called the transmitter is used to generate the high frequency signals, and these signals when accepted by a tuned receiver close a relay circuit which can be used to control clock correction, Program Bells, Lights, Heater Controls or other devices.

The Simplex master clock of the system is an elaborate "time switch" which periodically turns on the heaters and plate circuits of the tubes to operate the transmitter. This clock is built with provisions to keep it operating during a power failure and is capable of measuring the time the power has been off to a maximum of 24 hours.

The secondary clocks are equipped with dual motor movements and a receiver which will energize the high speed motors and de-energize the normal motors when a high frequency signal is present on the line.

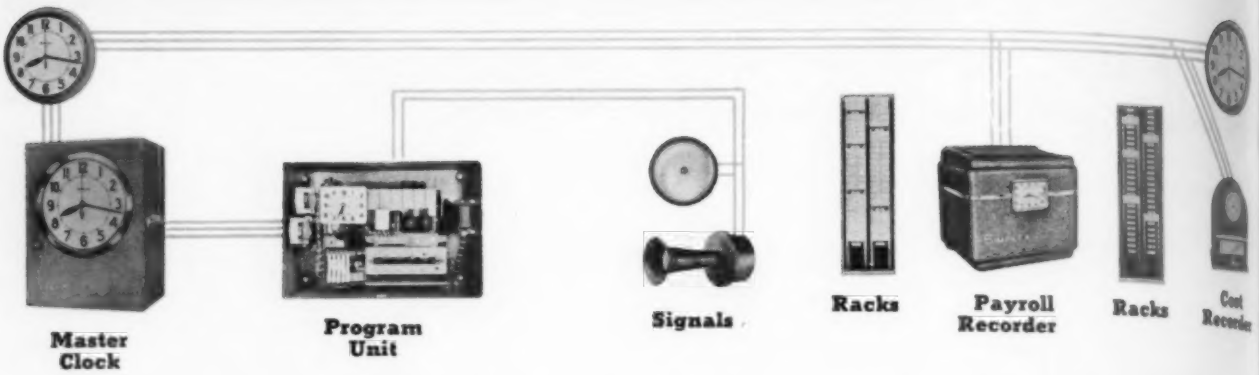
automatic 3 wire synchronous system no. 2

The Automatic 3 Wire Synchronous Master Clock is a synchronous motor driven clock mechanism. This unit provides hourly correction to all secondary time indicating clocks or recording units. This Simplex system utilizes the time proven features of dependable SYNCHRONOUS motor drive in the secondary time keeping and recording devices, and uses the Master Clock for ONE PURPOSE ONLY, namely; for the hourly supervision and correction of secondary unit time errors. At a given minute each hour, the Master Clock electrically compares the time accuracy of all secondary units and if any units are fast, those units hold up and wait for the others. If any units are slow, they are singled out and advanced 15 times normal speed unit they again synchronize to the master clock time. The correction range is 15 minutes slow or 1 minute fast. The Master Clock is equipped with a device to provide continued operation for a minimum period of 24 hours in the event of power line failure. It can be equipped with an accumulator device which will measure the duration of any overall power failure to a maximum of 24 hours. Upon resumption of main line power, automatic correction of secondary units takes place.

other systems on page 2

A.I.A. file no. 31-i-2

3 wire impulse master clock system — no. 3



The Simplex 3 Wire Impulse Master Clock is a synchronous motor driven clock mechanism with electrical contact provisions for operating a 3 Wire system of automatic resetting and synchronizing of secondary clocks or recorders. This is the conventional minute-impulse type of Master Control wherein an electrical impulse is transmitted to a 3 Wire secondary clock circuit thus advancing all secondary units in unison. At a given minute each hour the Master Clock compares its time with the time of all secondary units; all secondary units fast will hold up, and all secondary units slow will receive a series of fast impulses until correct time is indicated. Correction range of the Master Clock is 20 minutes fast or 20 minutes slow. This Master Clock can be equipped with a 24 hour accumulator device which will measure the duration of any overall power failure to a maximum of 24 hours. Upon resumption of main line power, automatic correction of secondary units takes place.

2 wire impulse master clock system — no. 4

The Simplex 2 Wire Impulse Master Clock is a synchronous motor driven clock mechanism with electrical contact provisions for operating a 2 Wire system of automatic resetting and synchronizing of secondary clocks or recorders. This system is similar to System No. 3 except that it is a 2 wire instead of 3 wire system. It also has a dual voltage type control to provide the unlocking impulse following hourly correction. This Master Clock can be equipped with a 24 hour accumulator device which will measure the duration of any overall power failure to a maximum of 24 hours. Upon resumption of main line power, automatic correction of secondary units takes place.

manual reset clock system — no. 5

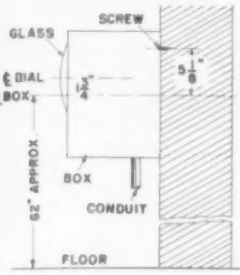
For this type of system each clock on the system is equipped with a special movement. During operation the normal motor in each device operates the clocks at normal rate. When a power interruption occurs, all clocks stop. When the power returns, all clocks start again automatically, but they are slow to the extent of the interruption. To return to correct time, it is necessary to simply throw the reset switch of the control to the "advance" position with the switch provided, thereby supplying power to the resetting motor which operates to cause all clocks to operate at 15 times their normal rate. When the clocks are again back to the correct time, as observed visually, the reset switch is thrown to the "normal" position, thereby restoring the system to correct time and normal operation. The entire clock system may be de-energized at any time by throwing a switch on the control to the stop or system-off position. A group corrective system which also provides for synchronizing of individual clocks and sweep-second hands by proper use of control unit.

Simplex master clock and program systems

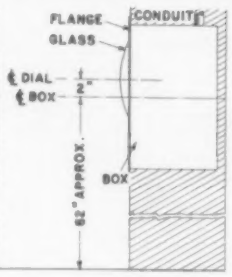
master clock • *surface or flush mount*



surface mount



surface mount



flush mount

Surface Mount			Flush Mount		
Overall Height	Overall Width	Projection from Wall	Overall Height	Overall Width	Projection from Wall
14½"	11"	10½"	17¾"	13¾"	⅞"

Model M1W73A Master Clock, synchronous motor drive with standby and accumulator for 3 wire hourly corrective impulse system.

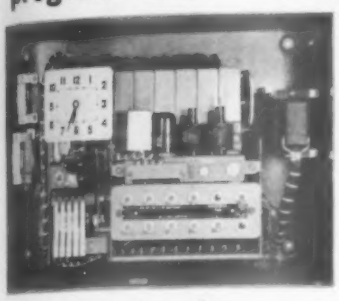
Model M1W72A Master Clock, synchronous motor drive with standby and accumulator for 2 wire hourly corrective impulse system.

Model MSE7 Master Clock, synchronous motor drive with standby and accumulator for electronic hourly corrective system.

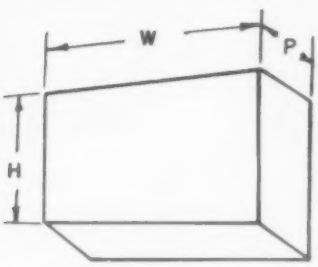
Model MSW 7 Master Clock, synchronous motor drive with standby and accumulator for 3 wire synchronous hourly corrective system.

Model MSM 7 Manual control station for group corrective manual system.

program unit • *furnished in 2, 4 or 6 circuits*



program unit
surface or flush mount



flush mount

Surface Mount			Flush Mount		
Overall Height H	Overall Width W	Projection from Wall P	Overall Height H	Overall Width W	Projection from Wall P
12⅝"	18⅜"	7¾"	16"	22"	3/16

Model PIW 683A Program Machine, impulse drive hourly corrective 3 wire system. 6 circuit 24 hour with calendar. Surface or flush mount.

Model PIW 682A Program Machine, impulse drive hourly corrective 2 wire system. 6 circuit 24 hour with calendar. Surface or flush mount.

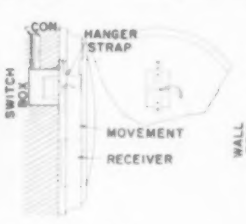
Model PSE 58 Program Machine, synchronous drive electronic hourly correction 4 circuit electronic signalling 1 wired circuit, 24 hour with calendar. Surface or flush mount.

Model PSW68 Program Machine synchronous drive wired hourly correction, 6 circuit 24 hour with calendar. Surface or flush mount.

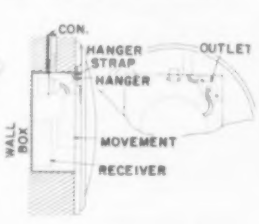
Model PSM 68 Program Machine, synchronous drive 3 wire group corrective system 6 circuit 24 hour with calendar. Surface or flush mount.

secondary clock • *surface or flush mount*





surface mount



flush mount

Surface Mount			Flush Mount		
Dial Size	Overall Diameter	Overall Depth	Dial Size	Overall Diameter	Overall Depth
8"	11 7/16"	3"	8"	10 3/16"	1 9/16"
12"	15¼"	3"	12"	14"	1 9/16"
16"	18 27/32"	3"	16"	17 19/32"	1 9/16"

RIW83A Secondary Clock, impulse drive hourly corrective 12" dial for 3 wire system. Surface or flush mount.

RSE8 Secondary Clock, synchronous motor drive, 12" dial for electronic hourly correction. Surface or flush.

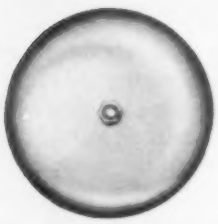
RSW8 Secondary Clock, synchronous motor drive 12" dial wired hourly correction. Surface or flush mount.

RSM8 Secondary Clock, synchronous motor drive 3 wire group correction 12" dial. Surface or flush mount.

RIW82 Secondary Clock, impulse drive non-corrective straight 2 wire minute impulse 12" dial. Surface or flush mount.

Simplex master clock and program systems

signal equipment



Bell model 6B110A



Horn model 122 AW



Buzzer model ZR-7

other Simplex time recording products

Simplex payroll recorder



Simplex payroll recorder

The Simplex Trigger-touch Payroll Recorder is fully automatic. It positions the card automatically for each payroll period. It prevents improper registrations such as "back side to" or "up side down." It provides a red tardy signal, in or out. Speeds up clock line. Makes for faster payroll make-up.

Simplex electric time stamp



Simplex electric time stamp

A must for regular mail handling. Also settles disputes about when work-in-progress forms are received and passed along. Every responsible department head and foreman welcomes its protection. Eliminates doubt, dispute, and delay. Automatically registers as contact is made with paper.

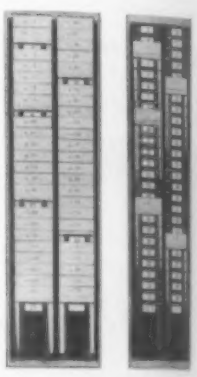
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Simplex watchclocks

Provide positive proof that your watchmen made their rounds at the times shown. Sturdily built for rough usage. Tamper-proof. Your best protection against fire losses, burglaries and pilferage.

Simplex card racks



Simplex card racks

All-steel, extra card racks. For small segregated or remote groups of employees. Eliminate clock rush, work stoppages. Permit foremen to check absentees and rearrange production schedules.

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Portland

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"time systems since 1888"

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The Baldwin Piano Company	D 24, 25

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Kliegl Bros.	**D b/2**
Novelty Scenic Studios, Inc.	**D b/4**
Century Lighting, Inc.	**D b/5**
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The Bassick Company	**D c/5**
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for 2" x 2" slides and 35-mm film strips. Choice of 3½", 5", or 7" lens. Prices from $103.50.

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OPAQUE 1000

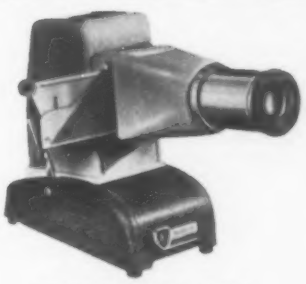
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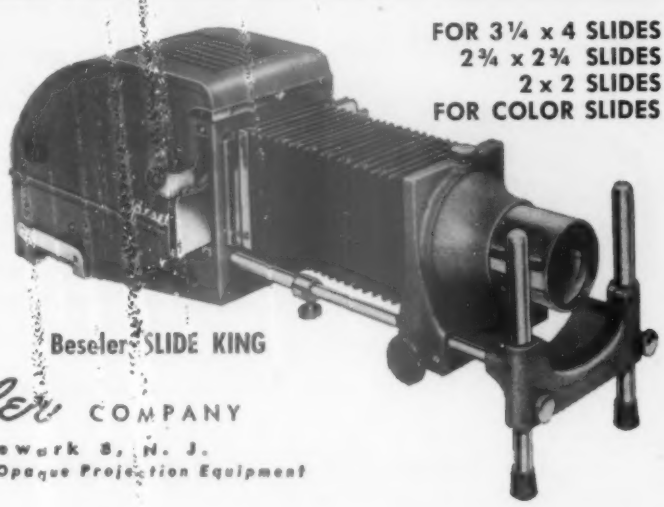
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St. Charles, Illinois



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St. Charles, Illinois

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The newly engineered mechanism features a minimum of moving parts and rigid, heavy-duty construction, offering you the utmost in durability and lifelong service and satisfaction.

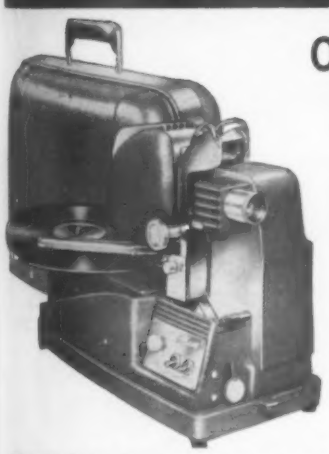
The high fidelity amplifier is designed for superb sound. A specially built DuKane speaker and matching baffle gives faithful reproduction.

Frequency response characteristics meet standards set by National Association of Radio and Television Broadcasters for radio broadcast and portable and studio equipment.

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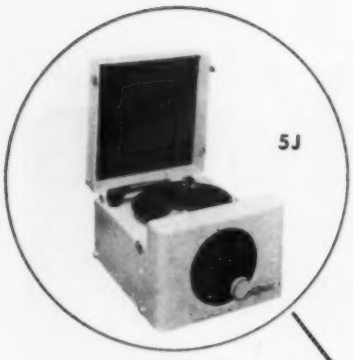
One Picture is Worth 1000 Words . . . and More . . . shown with New, Modern DuKane Sound Slidefilm Projectors!

Successor to the famous "Explainette", the DuKane is now a compact streamlined Sound Slidefilm Projector (filmstrip with recorded sound), one of the most dynamic Audio-Visual aids. Models available in manual or automatic, 150 or 300 watt, as required. Also used for public address, silent projecting, and slides. Extremely modern in design, light and simple in operation, perfect for school use.

DUKANE CORPORATION DEPT. SU5, St. Charles, Ill.

CALIFONE CORPORATION

1041 N. Sycamore Ave., Hollywood 38, Calif.



5J—$59.95 Plus Excise Tax

A 3-speed portable with full rich tones and ample volume for a large classroom.

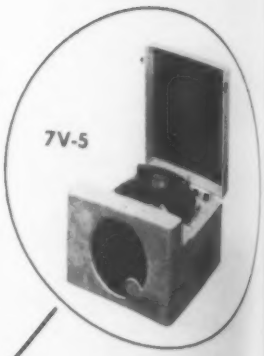
- Wide range tone control
- Plays 7"-12" records with lid closed
- 8" 3.2 oz. Alnico V speaker
- New Baritite cartridge
- Output jack for external speaker, amplifier or headphone
- Weighs only 12 pounds



6U—$69.95

America's lightest weight and lowest priced player for 16" transcriptions.

- 3-speed 9" turntable
- Wrist-action pickup with new Baritite cartridge
- 4 watt high gain amplifier
- Powerful 8" speaker
- Tone control adjusts both treble and bass



7V-5—82.95 Plus Excise Tax

The choice by comparison in classroom players, with Califone's exclusive Varipole variable speed.

- All-speed 10" turntable
- Wide range tone control
- Plays 7"-12" records with lid closed
- 8" 3.2 oz. Alnico V speaker
- New Baritite cartridge
- Output jack for external speaker, amplifier or headphone
- Weighs only 12 pounds

12V-5—$122.50
12VJ8-5—$127.50

Recommended where one player must serve many requirements, this unit is our most popular model. Ideal for dancing, music, public speaking, typing classes and auditorium use for up to 1,000 persons.

- All-speed Varipole 10" turntable
- 6 watts undistorted, 10 watts peak
- New Baritite cartridge
- Wrist-action pickup for 7"-16" recordings
- Mixer controls: mike & phonograph
- Separate treble and bass controls
- Library Model 12VJ8-5 offers provision for eight sets of headphones



PHONOGRAPHS

TRANSCRIPTION PLAYERS

SOUND SYSTEMS

CALIFONES are recommended for Classrooms, Libraries, Auditoriums and Gymnasiums. There is a Califone model for every school requirement.

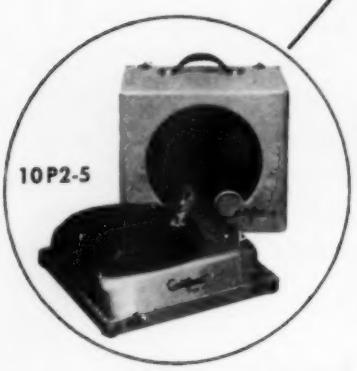
VARIPOLE is Califone's exclusive, patented variable speed control—an accurate means of slowing down or speeding up the tempo for the full and proper use of rhythm.



10J—$84.50

This new 16-pound transcription player brings true fidelity to the classroom at a low price never before possible.

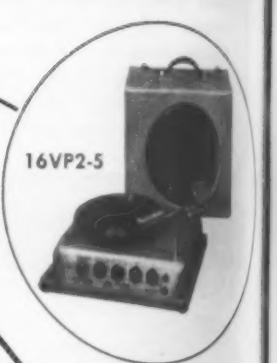
- 3-speed 9" turntable
- 8" extended range speaker
- 5 watts undistorted, 7 watts peak
- Wrist-action pickup for 7"-12" records, with new Baritite cartridge
- Mixer controls for mike and phonograph
- Separate treble and bass controls



10P2-5—$99.50

This popular high fidelity model now offered with an extended range 12" speaker to get the most out of its G.E. variable reluctance cartridge.

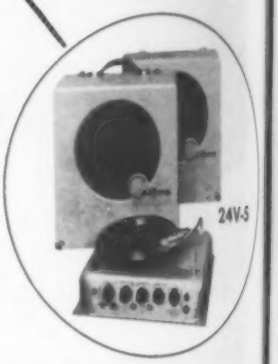
- 3-speed 9" turntable
- 12" custom concert speaker
- 5 watts undistorted, 7 watts peak
- G.E. variable reluctance cartridge and preamplifier
- Wrist-action pickup for 7"-16" records
- Mixer controls for mike and phonograph
- Separate treble and bass controls



16VP2-5—$139.50
18VP2-5—$159.50

A more powerful version of our popular Model 12VP2-5 transcription player with G.E. variable reluctance cartridge and built-in preamplifier for highest fidelity.

- Maximum range straight AC amplifier
- 10 watts undistorted, 12 watts peak
- 25' speaker cable
- One 12" custom speaker on 16VP2-5
- Two 12" custom concert speakers on 18VP2-5



24V-5—$169.50

Most powerful single unit sound system to cover 3500 persons. Extra bass emphasis for dance groups. Weighs only 31 pounds.

- All-speed Varipole 10" turntable
- Wrist-action pickup for 7"-16" recordings with new Baritite cartridge
- 3-position mixer for 2 mikes and phonograph
- 16 watts undistorted, 24 watts peak
- 25' speaker cables
- Two 12" custom concert speakers

All prices quoted are School Net prices subject only to quantity discounts.

RADIO CORPORATION of AMERICA

EDUCATIONAL SERVICES, CAMDEN, N.J.

RCA VICTOR'S NEW "VICTROLA" 3-speed Phonographs



Superb performance from *all* your records. The ingenious "Slip-On" spindle gives full advantage to the RCA Victor "45" system and the most flexible, satisfying means of using all three speeds.

Models available include an attachment which will play through any radio or other sound system, a table model, a portable (illustrated), and phonograph-radio combinations.

A wide choice of models are also available, specifically designed to give the most faithful reproduction to the superior "45" system.

Write for illustrated literature

Model 2ES38. An ideal school portable, with 8-inch speaker.

RCA VICTOR TELEVISION

With Rotomatic Tuning

More to See! . . . Less to Do!

The natural choice for classroom television is RCA Victor, the leader in the industry. Now five ways finer, RCA Victor's television circuits assure you of finer, more dependable performance.

Pictures are clear, bright, steady—ideal for classroom viewing. A wide choice of instruments are available—table models, consoles and combinations—ideal for use in schools.

Write for illustrated literature



A typical 21-inch table model receiver.



RCA VICTOR RADIOS

RCA Victor's complete line of Radios—from table models to consoles—meet the requirements of both classroom and auditorium. Many models provide complete radio coverage . . . AM and RCA Victor FM—with the incomparable "Golden Throat" tone system. Console models are equipped with the new 3-speed changer that gives better performance from *all* records. Priced for school budgets.

RCA Victor Model 3RF91 AM-FM Radio for the classroom.

RCA VICTOR RECORDS

There is an astonishing wealth of material for enriching classroom instruction in RCA Victor's vast library of records.

Write for *new* Educational Record catalog which includes records for:

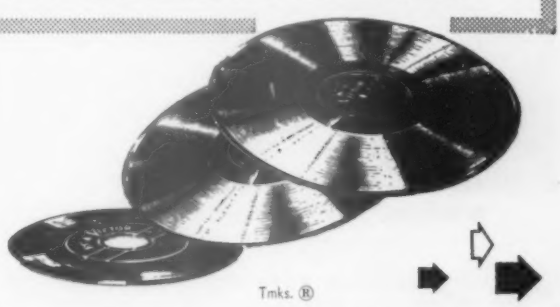
Elementary Schools

High Schools and Colleges

"A Singing School" textbooks (C. C. Birchard)

Folk and Square Dancing

Instruments of the orchestra



Tmks. ®

RADIO CORPORATION of AMERICA EDUCATIONAL SERVICES

Here's important news about
School Sound Systems



Equipped to serve up to 60 rooms, RCA Consolette mounted on matching console base, complete with AM-FM radio and phonograph turntable.



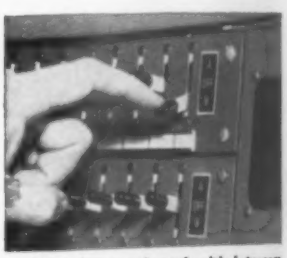
1. Complete roster at your fingertips—Here's your master list of rooms, ready for selection—singly or in combination. Set up any distribution list you want in seconds.



2. Add extra channels as your needs expand—Your RCA Consolette grows as your school expands. Keyboard panels can be added at any time to serve as many as 60 rooms.



3. Immediate switchover for emergency instructions—To issue emergency instructions or general announcements, turn master switch to "all" position. Give explicit instructions—"talk" your students to safety.



4. May be equipped with intercom system—Your RCA Consolette can be equipped to provide two-way conversation with any room in your school at the flip of a switch.

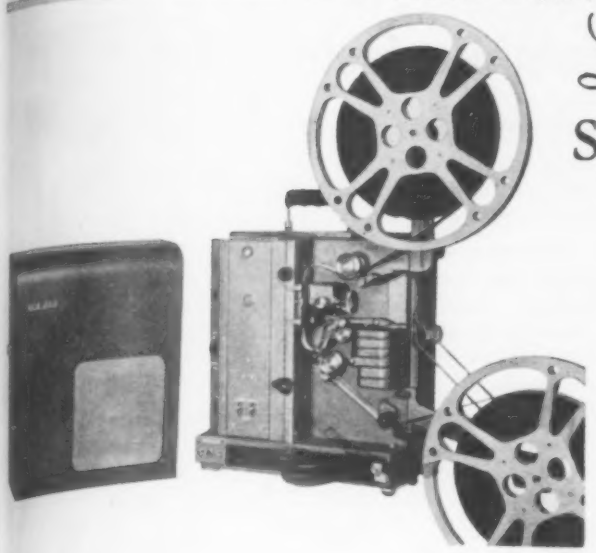
Streamline administration these 4 ways with RCA's Full-Function Consolette

Here's the answer to a thousand-and-one administrative details—the RCA Full-Function Consolette. Use it to distribute administrative information, instruction, music, radio broadcasts, and school entertainment to any list of rooms in your school. Use it to give yourself more time for important administrative affairs. It's faster than holding an assembly, more effective than distributing a memo. And it's built to perform with RCA superiority.

Whatever your requirements might be for a sound system for your school, RCA will be glad to help you select the correct system. Write to: RCA Educational Services, Dept. 2.

RADIO CORPORATION of AMERICA EDUCATIONAL SERVICES

The New RCA "400" Junior Lightweight 16mm Sound Movie Projector



The new RCA "400" Junior is a complete, single-case, portable 16mm projector. It is a professional-type, high-quality, sound-silent film projector. Brilliant screen illumination . . . rich tone quality . . . ease of setting up . . . simplified threading—make it the choice of leading schools for a classroom projector. Speaker is contained in a compact lift-off cover.

So light in weight a schoolgirl can pick it up to place on a table.

RCA "400" Senior 16mm Sound Motion Picture Projector

The RCA "400" Senior is a compact two-case 16mm projector. It is large enough and sufficiently powerful for "professional" use in school auditoriums, and at the same time, so portable it can be carried from place to place and quickly set up for film showings to large or small groups.

One case contains the projector famous for its high-quality sound amplifier, brilliant screen illumination, simplified film threading path and simplicity of operation. The speaker case is designed to deliver the finest in sound reproduction.

Write for illustrated literature on RCA 16mm Projectors



Finest in Projection
First in Sound

RADIO CORPORATION of AMERICA EDUCATIONAL SERVICES

RCA "400" Magnetic Sound 16mm Projector



The RCA "400" Magnetic Sound Projector is a deluxe instrument designed to enable the average person, lacking studio facilities, to record on magnetically striped film with excellent results, and at low cost.

Easy-to-operate controls permit quick, convenient recording, playback, erasing and re-recording. In addition to recording magnetic track, the equipment reproduces both optical and magnetic track, projects sharp, clear, professional quality pictures. It may also be employed as a limited public address system.

All the operating facilities are housed in a single-case, portable, attractively styled unit. A superb RCA speaker is in a separate case. The RCA Aerodynamic Microphone is optional at moderate extra cost.

Write for illustrated literature

RCA Modernphone Intercom System

Provides instant voice-to-voice intercommunication between the school administrator and key individuals in the school system. No looking up numbers. No dialing. One push of a button does it all . . . connects your party and rings his station instantly. RCA Modernphone is easy to install. It's battery-operated, needs no AC power. Can be AC operated, if desired. Built like standard telephone equipment for lifetime service.

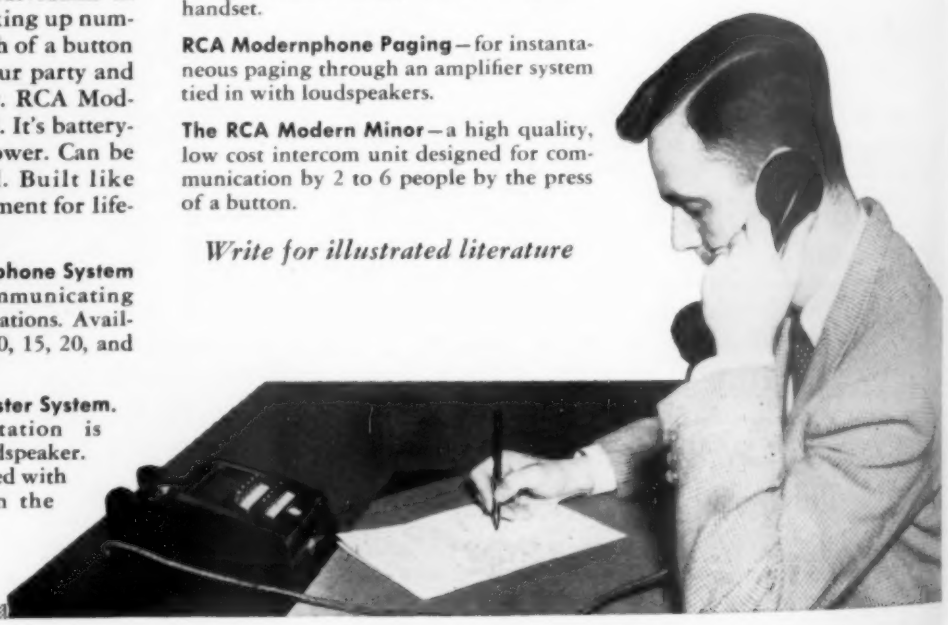
The Standard RCA Modernphone System—designed for intercommunicating between 6 and up to 120 stations. Available in desk units with 5, 10, 15, 20, and 30 push buttons.

The RCA Modernphone Master System. The executive-master station is equipped with a built-in loudspeaker. The staff stations are equipped with a signal that lights when the master station calls. Executive's conversation is completely secret. The executive-master station is equipped with a telephone handset.

RCA Modernphone Paging—for instantaneous paging through an amplifier system tied in with loudspeakers.

The RCA Modern Minor—a high quality, low cost intercom unit designed for communication by 2 to 6 people by the press of a button.

Write for illustrated literature



RADIO CORPORATION of AMERICA EDUCATIONAL SERVICES



RCA Industrial TELEVISION

Has Many Uses in Education

This is closed-circuit television in which the images are transmitted by wire instead of by broadcast. The pick-up camera is about as big as a 16mm home movie camera, weighs only 8 pounds. A suitcase-size control-receiver is the only other unit required for operation. This combines the power supply, sync generator, amplifying and deflection equipment, and a 10-inch kinescope monitor in a single portable unit. The entire system operates on ordinary 110-115 volt, 60 cycle alternating current.

RCA Industrial Television has many uses in the field of education. For example: in lectures and demonstrations where the subject of observation is not easily accessible . . . or where nearness brings danger . . . or the tiny size of the subject, such as a microscope slide, restricts close-up viewing by a great number of persons. With the RCA Industrial Television system these close-up views may be enlarged and projected instantaneously for convenience in teaching large groups of students.

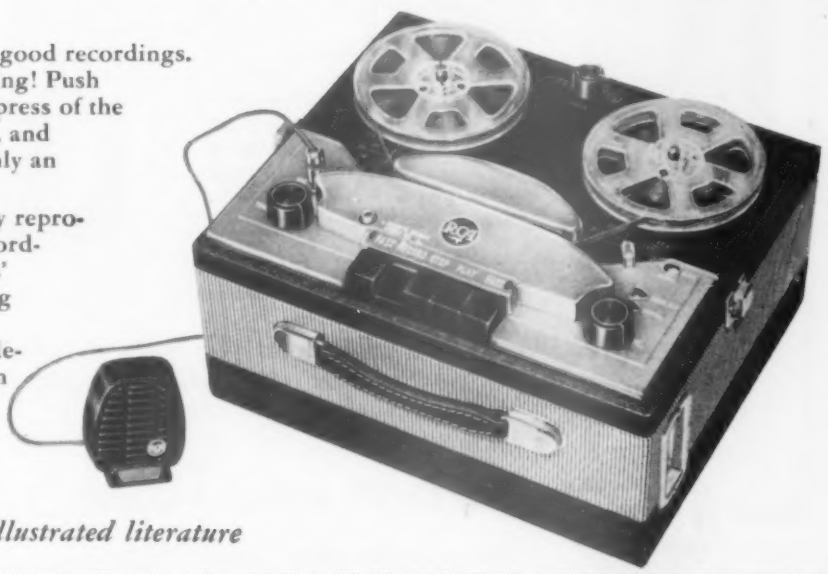
Write for illustrated literature

New

RCA PUSH-BUTTON TAPE RECORDER

No special skill is required to make good recordings. Just push a button . . . you're recording! Push a button . . . you're playing back! A press of the finger starts, stops, records, rewinds, and plays back true-to-life sounds that only an RCA quality machine can capture.

Two speeds: one for higher quality reproduction, the other for extra-long recordings. Dual Track Tape up to 2 hours' playing or recording time. Recording Volume Indicators show when recordings are best. Long-life, trouble-free construction, ideal for classroom use. Sturdy, easy-to-carry, reinforced case.



Write for illustrated literature

RADIO CORPORATION of AMERICA EDUCATIONAL SERVICES

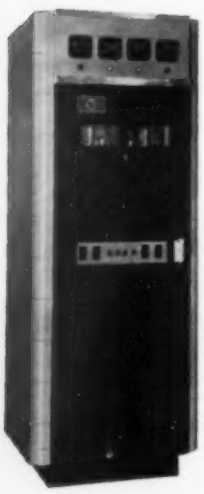
RCA
Test and Laboratory Equipment

RCA manufactures a wide variety of portable test and measuring instruments that are ideal for classroom instruction, laboratory work or research in radio and electronics. They are of laboratory-precision quality, incorporating features for high performance and long dependable service.

The complete line includes Oscilloscopes, Monitors, Audio and Video Measuring Equipment, Service Test Equipment.



RCA Radio & Television Broadcast Equipment



RCA's complete line of broadcast equipment includes everything for AM, FM and Television —from antenna transmitter and studio equipment to classroom receivers.

RCA is the leading supplier of radio and television broadcast equipment to the educational field. RCA engineers will be glad to help you in formulating your radio or television broadcasting plans. *Write for details.*

RCA Electron Microscope



Here's a new low-cost electron microscope for science classes and research workers in schools and colleges. This table-model RCA Electron Microscope permits the study of matter that is invisible in the light microscope. It gives visible magnification up to 6,000 diameters. A built-in camera makes it possible to obtain useful photo enlargements up to 40,000 diameters.

We'll be glad to send you more detailed information on RCA products for your school or college. Write Dept. 2.

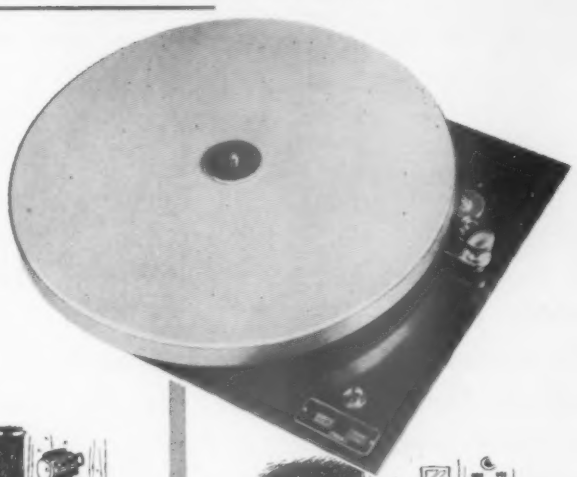
RADIO CORPORATION of AMERICA
EDUCATIONAL SERVICES, CAMDEN, N.J.

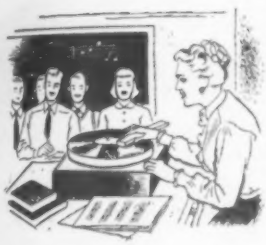
PRESTO RECORDING CORPORATION

Paramus, New Jersey

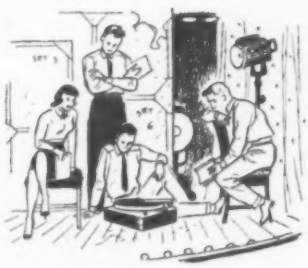
EXPORT DIVISION: 25 WARREN STREET, NEW YORK 7, N. Y.
CANADIAN DIVISION: WALTER P. DOWNS, LTD., DOMINION SQUARE BLDG., MONTREAL

THE PRESTO 15-G TURNTABLE gives superior reproduction...





for Critical study of masterpiece records in music appreciation classes



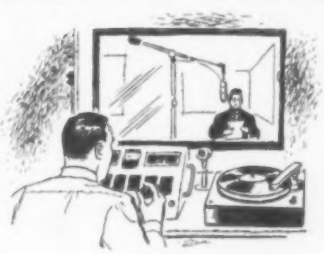
for Playback of recordings of dramatic class performances



for Existing sound systems in schools and colleges



for Better sound reproduction with slide or strip film showings



for College radio stations where professional reproduction is desired



for Audio experimentation in Radio and TV engineering classes

Here's a quiet, rumble-free, really accurate turntable that will give better reproduction of any record and will stand up under the roughest classroom use.

The 15-G is a 12-inch table, heavily made of cast aluminum with a mechanism constructed like expensive broadcast-type units. Instant selection of speeds . . . 78, 33⅓ and 45 rpm. The price is comfortably within any school budget . . . just $53.50.

As the world's leading manufacturer of recording discs, PRESTO especially recommends its ORANGE LABEL disc for schools, colleges and universities. Made with the same painstaking care as the famous GREEN LABEL line, this lighter weight, lower cost disc is ideal for every educational requirement.

Prices (including 40% educational discount):
8 inch—33c; 10 inch—51c; 12 inch—69c.



PRESTO RECORDING CORPORATION

WORLD'S LARGEST MANUFACTURER OF PRECISION RECORDING EQUIPMENT & DISCS

THE BALDWIN PIANO COMPANY

Home Office and Factory—Dept. ASU-4, 1801 Gilbert Avenue, Cincinnati 2, Ohio

Builders of: Baldwin Grand Pianos • Acrosonic Spinet Pianos • Hamilton Vertical Pianos • Baldwin and Orga-sonic Electronic Organs

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Recognizing today's highly exacting needs and demands in the field of education, the Baldwin Piano Company, builders of the world's finest keyboard instruments, has established quality and durability as the true measure of piano and organ value. These requirements must be fully met if educators are in turn to meet their responsibilities to today's youth.

That is why Baldwin and Baldwin-built pianos and organs are the choice of leading schools, conservatories, and colleges.

In appraising your piano and organ requirements call on your Baldwin dealer for assistance. You will find him willing and able to assist you in determining the proper style, size and type of Baldwin-built instrument to meet your needs today and in the years ahead.

Only Baldwin offers a complete selection of instruments built to uncompromising quality standards ranging from the 9′ Baldwin Concert Grand to the 36″ Acrosonic Spinet.

Baldwin



The Baldwin Style "F" Grand

The Style "D" Baldwin Concert Grand (length 9′) and Style "F" Grand (length 7′) are available in ebonized finish, the Style "L" Grand (length 6′, 3″) and Style "R" Grand (length 5′, 8″) are available in mahogany and ebonized finish and the Style "M" Grand (length 5′, 2″) is available in mahogany, walnut and ebonized finish.

The Baldwin Grand is the instrument chosen by today's outstanding concert artists who know and insist on the finest. Those charged with the responsibility of purchasing pianos for school use will do well to be guided by the considered opinion of these experts, for, truly, the Baldwin Grand is the piano by which all are judged.

THE BALDWIN PIANO COMPANY



The Hamilton Vertical Piano

The Hamilton Vertical, built by Baldwin, has won its place as a leading piano for school and studio use by meeting the need for a compact piano with full resonant tone and exceptional response. Equipped with special school casters to facilitate moving, the Style 242 Hamilton is available in dark oak, light oak, or mahogany finish. Height 45″, Width 56″, Depth 25″.



The Acrosonic Spinet Piano

Available in eight distinctive and beautifully styled models, the Acrosonic by Baldwin features the famous "Full-Blow" action in addition to the many other outstanding and exclusive construction features that have made the Acrosonic "today's finest small piano." The Acrosonic Spinet is built in both the 36″ and 40″ heights and offers a selection of beautiful and durable hand-rubbed finishes. Model 979, illustrated.



The Orga-sonic Spinet Organ

The Orga-sonic Spinet Organ by Baldwin is ideally suited to school budgets and requirements. Tone color range is broad and comprehensive. All four basic families of organ tone are adequately represented. 19 independent stops and one coupler give utmost flexibility. Model 40, illustrated, requires less space than a spinet piano. Height 37¼″, Width 46″, Depth 26″.



The Baldwin Electronic Organ

The Baldwin Electronic Organ, Model 10, is a complete and comprehensive organ. Adhering to standards established by the American Guild of Organists, specifications include thirty-one independent stops, ten couplers, double expression, register crescendo pedal and ten completely adjustable combination pistons. With these special features, the musical variety and tonal responsiveness of the Model 10 are virtually unlimited.

See Your Dealer or Write Direct Today!

BORROUGHS MANUFACTURING COMPANY

A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT

3002 North Burdick, Kalamazoo, Michigan

BORROUGHS PRODUCTS

meet the needs of schools and universities everywhere

flexi LIBRARY SHELVING

Sliding Shelves • ¾" vertical adjustment

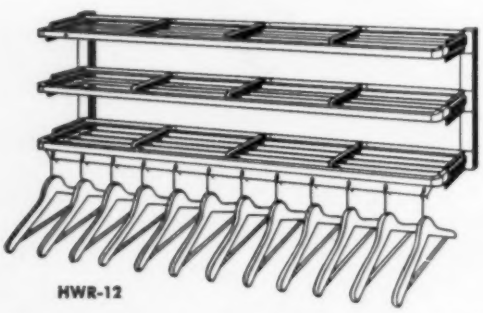
Practical, efficient and flexible. Available in single or double-faced units with open or closed backs. 3 heights (42"-84"-90"). Width of unit 36". Depth of shelves 9¼". Open-back units have rear book stops. No unsightly cross-sway braces. 1-piece bottom. 1-piece double-faced end panels. Cornice tops. If you are not acquainted with the Borroughs representative in your city, write us for his address.



8409 OB

8409

WALL WRAP RACK



HWR-12

There are 2 sizes in Borroughs Wall Wrap Racks. HWR-6 accommodates 6 coats and 6 hats, and HWR-12 accommodates 12 coats and 12 hats. All dimensions the same as the Wrap Rack, except the height which is 14⅝" overall. Units are easily attached by means of separate brackets. More data on request.

WRAP RACKS



WR-12



WR-24-DF



WR-12 plus WR-12-A

The Borroughs Wrap Rack is available in 3 standard sizes to accommodate 6, 12 or 24 coats and hats. Its rigid steel construction is spot welded for added strength. Coats have clear hanging space . . there are no obstructions . . coats hang straight. Hats rest on round rods and not on dusty shelves. Adaptability is the word that best describes the flexibility of the Borroughs Wrap Rack. Not only can you add "add-units", but you can also increase the capacity of each standard unit by the even foot, thereby increasing hanging space by 3 garments to each foot added. For further information, see your Borroughs representative.

Unit Number	Width	Height	Depth	Wrap Cap.	Hat Cap.
WR-6	25¾"	76¾"	16"	6	6
WR-12	50"	76¾"	16"	12	12
WR-12 plus WR-12A	99"	76¾"	16"	24	24
WR-24-DF	50"	76¾"	28⅜"	24	24
WR-24-DF-A	49"	76¾"	28⅜"	24	24

Checkerette®

Space Saving* WARDROBE RACKS

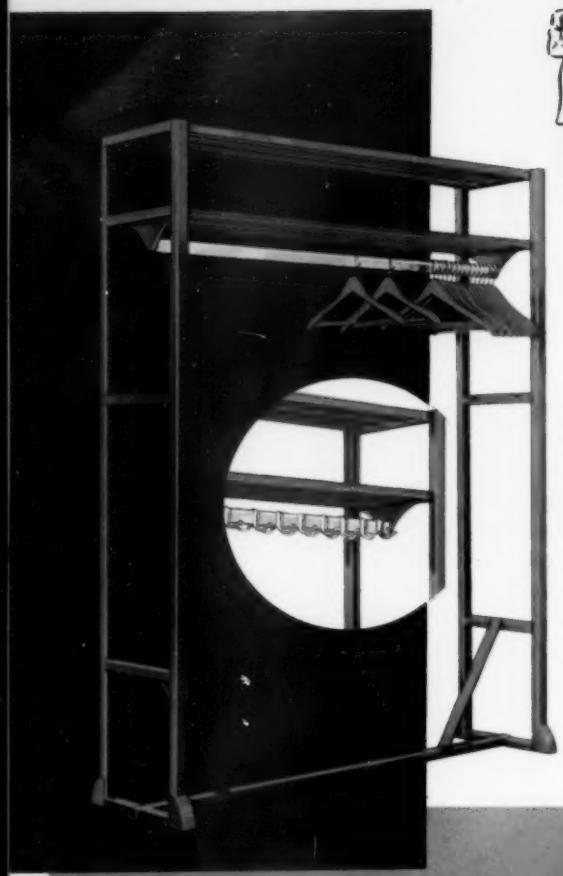


"There is a Checkerette to answer every "wraps" problem because these small compact units, that go anywhere, have astonishing capacity—accommodate many coats and hats in minimum floor space.

Checkerettes not only have the strength and rigidity for permanent installations, they also have unique advantages for temporary uses. They can be "knocked down" and stacked, stored or transported as readily as folding chairs or card tables. They can be carried (or wheeled) to any spot needed, and set up in a few minutes without bolts, nuts or tools. Always available when needed and out of the way when out of use.

VOGEL-PETERSON COMPANY *"The Coat Rack People"* **CHICAGO, U. S. A.**

Checkerette



No. S-4-Ct Single Checkerette with one hanger bar can be used against the wall or as an island rack (see table below)

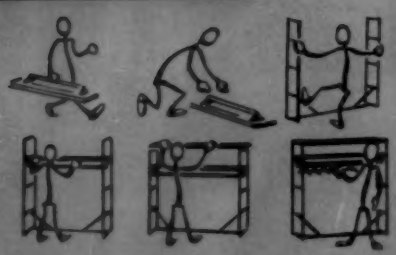
Pat. Nos. 2589269 2589947 and other pat. pending.

Single and Double Faced Floor Racks

Checkerette floor type wardrobe racks come in two types—with single or double hanger bars. The hanger bars hold either coat hangers or snap-over, 2-sided coat hooks. There are two hat shelves above the hanger bar (or bars).

Checkerettes are strongly built of welded heavy gauge steel and will give lifetime service. In use, they are rigid under any load, never sag, wobble or quiver. Still, they are so well engineered that they can be "knocked-down" or "set-up" without tools in less than a minute. There are no nuts, washers, bolts or other small parts to attach, misplace or lose. Condensed into a conveniently sized, self-package; when not in use it can be stored or transported efficiently. A single ½ ton pick up truck can easily carry Checkerettes to accommodate the wraps of 600 people. One person can carry (or wheel) a "knocked-down" Checkerette to any spot needed without danger of marring walls or doorways enroute.

Checkerettes are smart and clean-lined in design—beautifully finished in gray baked enamel. They fit in anywhere.



GO ANYWHERE . . . SET UP IN A MINUTE! WITHOUT NUTS, BOLTS OR TOOLS

Engage bottom cross brace into notched openings in center of upright bases. Lower hinged diagonal braces, setting them inside of raised stops.

Engage lower shelf (with hanger bar) into keyed notches on one end frame—then draw opposite end frame in, to engage other end of shelf. (Note: Second position from top for Adults—Third position from top for small children.)

Repeat operation No. 3 to engage top shelf.

Rack automatically under stress locks connected members.

Check these Unique Features

1. Square shaped tubular steel construction gives strength and rigidity with light weight.
2. Base Bar locks into upright ends.
3. Hinged end braces swing into keyed seats on Base Bar.
4. Shelf ends have self-locking dovetails that slip into cross bar between uprights, pulling against braces thereby holding entire assembly rigid. Cannot collapse in use.
5. Shelves are ventilated—are built up on boxed channel forms. No sharp edges.
6. Lower shelf carries 1 or 2 full length hanger bars for hooks or coat hangers.
7. The CHECKERETTE can be assembled with shelves in high (for adults) or low (for small children) positions.
8. Hangers or Snap-over Hooks available in quantity desired. Snap-over Hooks can be removed, slid aside or used in conjunction with hangers.
9. Built-in gliders on base prevent marring of floors or snagging of carpets. Special caster base is also available. (See following page.)
10. Quickly disassembled, the CHECKERETTE makes a compact self-package for easy carrying (or wheeling).

Catalog No.	Number of and length of Hanger Bars	Capacity with double hooks	Capacity with coat hangers	Overall length	Maximum width	Height
S-3-CT	1—3 ft.	24	18	3 ft. 4 in.	16¼ in.	5 ft. 8¼ in.
S-4-CT	1—4 ft.	32	24	4 ft. 4 in.	16¼ in.	5 ft. 8¼ in.
D-3-CT	2—3 ft.	48	36	3 ft. 4 in.	20 in.	5 ft. 11¼ in.
D-4-CT	2—4 ft.	64	48	4 ft. 4 in.	20 in.	5 ft. 11¼ in.

Checkerette floor models come boxed ready to set-up.

The best answer for many every day "wraps" problems

FOR THE HOME

Accommodates large groups at parties or gatherings—easily, efficiently and safely.

FOR STORAGE

Provides "that extra closet" or store room for garment bags and out-of-season wraps.

FOR THE GAME ROOM

No game room is complete without a *Checkerette*.

FOR THE LAUNDRY

Provides an efficient place to hang blouses, shirts and dresses when ironing.

FOR HOTELS

For the lobby (self service) and the coffee shop; for the dinner parties and private dining rooms; as auxiliary and stand-by checking equipment for conventions and crowds; for emptying closets while decorating suites of permanent guests.

FOR CLUBS

In billiard rooms, card rooms, [illegible] rooms and special meetings.

FOR COUNTRY CLUBS

For grilles, dances, dinners, valet service and drying and airing clothes.

FOR SCHOOLS AND COLLEGES

In school lunch rooms, for holding [illegible] storing band uniforms, athletic [illegible] forms, military uniforms . . . for [illegible] and P.T.A. meetings, school clubs [illegible] dances.

The double Checkerette®



CHECKERETTE CASTER BASE



Fits all Checkerette floor racks. Can be temporarily or permanently attached to make any Checkerette "portable". Permits rack to roll on casters when set up (or "knocked-down"). Provides easy movement of loaded racks (as when emptying clothes closets for decorating, etc.).

CHECKERETTE COAT HANGERS



Checkerette coat hangers are correctly formed to keep wraps "in press". Their flat-sided hooks keep clothing aligned in a neat vertical row, still lift off bar readily. Each hanger also has a small under-hook for hanging parasols, overshoes, bags, etc.

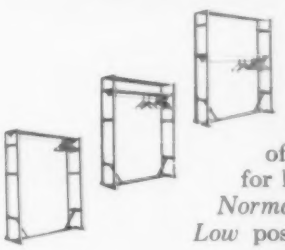
CHECKERETTE SADDLE COAT HOOK



These 2-sided hooks snap over the top of the hanger bar. Each takes 2 coats — one on each side of the bar. They can be slid along the bar to any desired spacing, or easily "snapped" off the bar to make room for coat hangers.

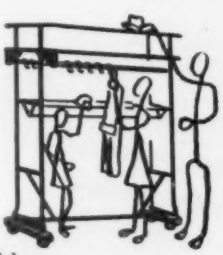
No. D-4-CT

This portable Double faced island Checkerette has double-width hat shelves, two hanger bars (one on each side), and a caster base. (See table on Page 2). Pat. Pending.



MEET ALL NEEDS

Checkerettes can be set up with hanger shelf bar in choice of 3 positions: "*High*" position for long robes, garment bags, etc. *Normal* position for adult wraps and *Low* position for small children.



The extreme versatility and capacity of Checkerette racks is demonstrated in this popular "Church Assembly" With a single faced hanger bar shelf added in low position to a double faced Checkerette this 4 ft. 4 in. rack provides 64 coat hooks and 2 double width hat shelves for adults, and 32 coat hooks and hat shelf below it for children —accommodation for the entire family.

FOR CHURCHES

To keep wraps out of pews and increase seating capacity . . . for church dinners and meetings, instruction classes and Sunday school, for choir robes and vestments.

FOR KINDERGARTEN AND SUNDAY SCHOOL

Shelves can be assembled in the low position to enable small children to hang up (and recover) their own coats and hats.



FOR RESTAURANTS AND CAFES

The complete answer to the wraps problem, for each of these small compact racks accommodates 32 or more persons.



FOR CATERERS

Bring this portable "check room" with the food. Here is a complete service that offers an extra profit.



CHAIR RENTAL FIRMS

A logical addition to your chair rental service—renting one or more *Checkerettes*. Easily go in the same truck—increase the "pay" load.



FOR MORTUARIES

For both chapel and home services.

DEPARTMENT STORES



For tea rooms and rest rooms. For merchandise display (as garment bags—dresses—suits—coats)—for direct sale to home owners.

ALSO FOR

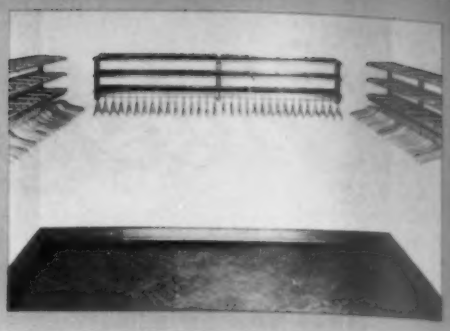
Libraries, Barber Shops, Beauty Parlors, Lodge Halls, Dancing Classes, Reading Rooms—wherever people gather.



2-shelf Valet Rack, mounted low on wall for boys' private school.



Accommodations for 72 provided in blind end of narrow hall.



"Waste space" entrance to storage room becomes efficient "locker room" for 48 students.



Corner of gymnasium provides wall for the large capacity rack.

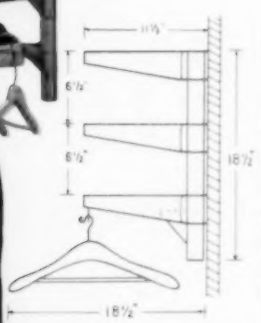
The VALET MOUNT-ON-WALL RACKS
Hat and Coat Racks

These efficient, space saving all-purpose racks answer innumerable wraps problems—as school "lockers" they keep student wraps aired, dry and in press. Installed on any available wall—in or outside of class rooms, laboratories, lunch rooms, auditoriums or gymnasiums, they provide large capacity sanitary wardrobe accommodations in little space, for they provide 3 spaced coat hangers and 3 ventilated hat spaces per running foot.

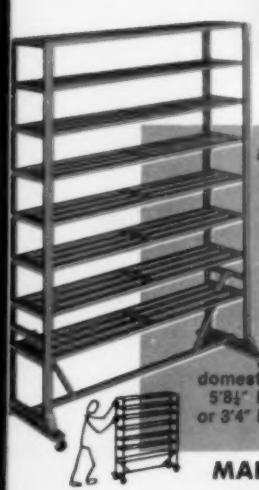
Sturdily built of welded heavy gauge furniture steel and finished in baked enamel, they fit in anywhere, attach directly to walls.



Come in any length by the ft.



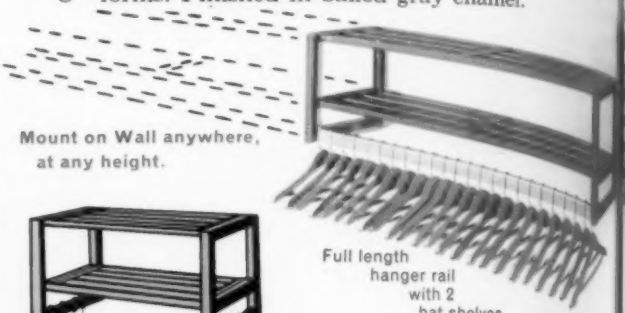
Mount at any height—to accommodate each age group.



Checkerette® MOUNT-ON-WALL
Hat and Coat Racks

Checkerette wall-mounted racks come in 2 ft., 3 ft., and 4 ft. units which can be used independently or will interlock to make continuous racks of any length. They make ideal fixtures for wraps in class rooms, school cafeterias, for holding athletic gear, band uniforms, choir robes, shop coats, etc. Each carries a full length hanger bar that takes up to 6 coat hangers per running foot. Where extreme capacity for space is required capacity can be doubled by using double straddle hooks that snap over bar in place of coat hangers. Even this doubled capacity can be increased by adding a second hanger bar.

Built for lifetime service, of heavy gauge steel box and "U" forms. Finished in baked gray enamel.

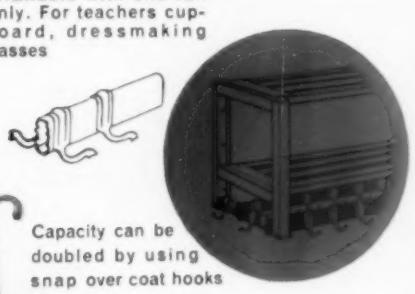


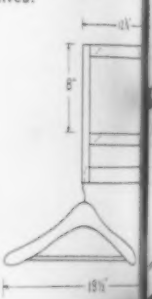
Mount on Wall anywhere, at any height.



Full length hanger rail with 2 hat shelves.

Available with end rail only. For teachers cupboard, dressmaking classes





Capacity can be doubled by using snap over coat hooks



Checkerette HATTER

The large capacity rack can be set up anywhere where needed in a few minutes without tools, stores away like folding chair when not in use. It has many school uses—as: a storage rack for stationery, apparatus, athletic gear, shop work and tools—as a library rack or a hot-plate rack in domestic science or school restaurants, etc. 5'8½" high, base 16½" deep, in either 4'4" or 3'4" length. Casters available.



STORMRAK

Placed at entrances in foul weather, these handy little units will prevent a lot of tracking and cleaning. Each holds 8 umbrellas and 9 pairs of overshoes.

Catalog No.	Length Hanger Bar	Capacity with Double hooks	Capacity with hangers	DIMENSIONS Overall length	Maximum Width	Height
W-2-CT	2-foot	28	12	2'4"	13"	13½"
W-3-CT	3-foot	36	18	3'4"	13"	10½"
W-4-CT	4-foot	44	24	4'4"	13"	13½"

Write for Catalog SU-45 covering complete line of "Checker" Checkroom equipment for use in schools, colleges and all public buildings.

MANUFACTURED ONLY BY

VOGEL-PETERSON COMPANY

"THE COAT RACK PEOPLE"

1121 WEST 37th STREET • CHICAGO 9, ILLINOIS



KLIEGL BROS

systemized lighting *for* stage·studio auditorium gymnasium

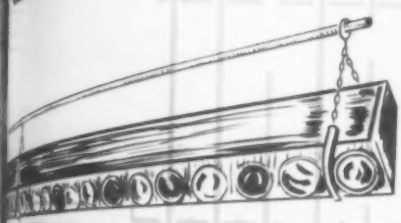
stage lighting

Kliegl devices offer unlimited possibilities for theatrical, recreational and general illumination. Some of our stage lighting products are here shown. Equipment precisely suited to your needs can readily be selected from our vast complete line of lighting specialties. A competent staff assures proper fulfillment of your requirements. Practical suggestions and planning aids are offered, of course without obligation.

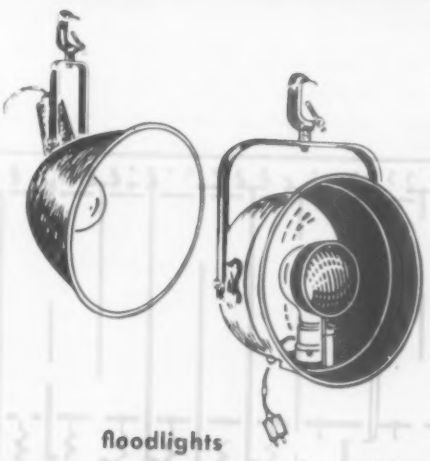




footlights



borderlights



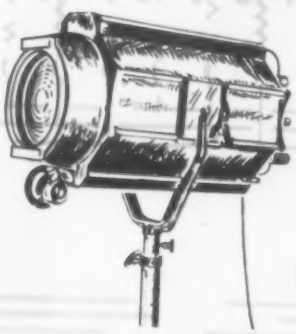
floodlights



Klieglights



fresnel lens spotlights



follow spots



heavy duty outlets

KLIEGL systemized lighting

Continually engaged in lighting since 1896, for more than half a century, the revealing test of time has proven the merits of our output and the competence of our staff. Recognized as a leader in the field of specialty lighting, our trade mark "Kliegl Bros", symbolic of quality and fine craftsmanship, is known throughout the world. Years of successful achievements have established our reputation for extraordinary skill in solving intricate lighting problems in a satisfactory manner.

With a wealth of experience in all kinds of lighting adaptations, and a sound knowledge of the technicalities of illumination, we effectively apply the fundamental principles of lighting to specific needs for the accomplishment of desired results.

auditorium lighting

The success of meetings, assemblies, programs and musicals depends on audience receptiveness. Lighting for rostrum, stage and auditorium must be designed for flexible control so that the illumination can readily be adjusted to properly conform with the nature of the event and participating groups. Controls are explained on page three; components on page four.



gymnasium lighting

It is especially important for lighting to be Kliegl-systemized for gymnasiums that so often must serve as meeting and exhibit halls as well as sports centers. Each activity needs its own special lighting . . . a requirement often unsatisfied by just a group of fixtures that must be overstrained for illuminating the varying uses of the gym.



television studio lighting

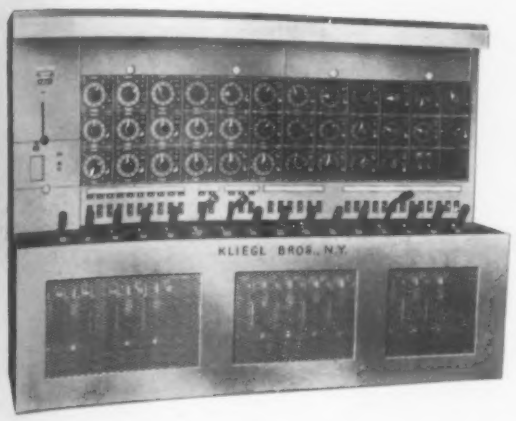
Proper TV lighting equipment controlled by flexible, selective Kliegboard facilities simplifies the telecasting of quality programs of unlimited variety, with comparative ease. Components are available in a variety of forms suitable for particular needs.



switchboards

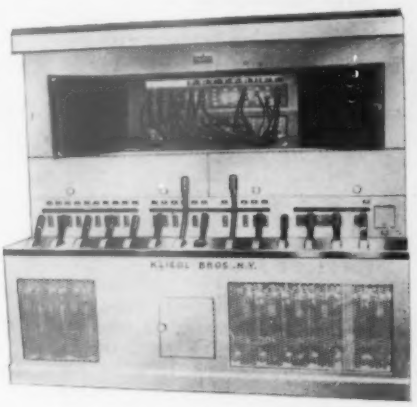
Adequate control demands effective utilization of the available lighting equipment in its application to the presentation's immediate requirements as well as adaptation to the necessity for frequent changes.

Through its instrumentation, the Kliegl Distribution and Control System exercises all-inclusive centralized control of both lights and circuiting in a simplified manner. It permits manipulation not only of the distribution circuits, lights, and dimmers used for dramatic light plots or other visual effects, but also provides in some instances for control of the general illumination of the house or auditorium and supplementary service equipment such as orchestra lights, dressing room lights, signal systems, et cetera.



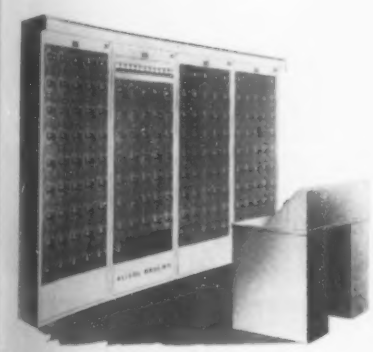
rotolector kliegboard design R-1

Fulfills all practical requirements for speedy adaptability to ever changing needs. Rotolector Kliegboards combine instantaneous selectivity with unrestricted flexibility, thus heighten efficiency, save time, lower costs. Operations are simple manipulations. No "live" parts handled or exposed. Circuits in use are indicated by pilot lights. Transfer of load between sources accomplished without going through other live circuits. A number of outlets may be grouped on the same dim or non-dim feeder circuit up to full rated capacity, with overload protection.



patch plug kliegboard design PP-1

Self-contained arrangement for moderate requirements. Utilizes short jumpers of flexible cable with pin-connectors for selective distribution of circuits. Any load circuit may be connected to any desired control circuit with or without dimming provisions.



Bank of Rotolectors for selective circuiting, with numerical identification of feeders and outlets. Ammeters show total load on dimmer circuits. Control console for all circuits, foreground.



Kliegtronic Console with control panels for all circuits at desk height. All adjustments within easy reach of seated operator.



safpatch kliegboard
design SP-1

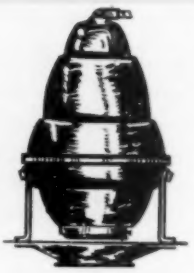
Embodies latest developments in patch-board arrangements, with coordinated circuit breaker and pin plug that automatically prevent live "make" or "break" of circuiting connections.

KLIEGL BROS

components for planned lighting

downlights

Concealed over-ceiling fixtures with ellipsodial reflector and fixed focus optical system, for general interior lighting of large area from lofty ceilings. Provides direct illumination from relatively small aperture in ceiling.



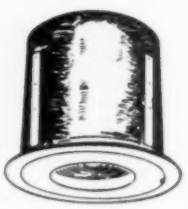
flush lens units

Inbuilt ceiling fixtures with circular Fresnel lens flush with ceiling line. Highly efficient, unobtrusive general utility fixtures suitable for wide range of applications.



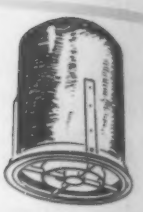
recessed lens units

Similar to flush lens type fixtures except lens is set back in the face plate, a few inches above the ceiling line, to exclude side glare in low ceiling installations.



flush louver units

Inbuilt ceiling fixtures with directional reflector and louvered ring light shields designed to produce evenly distributed illumination with minimum light loss and freedom from glare.



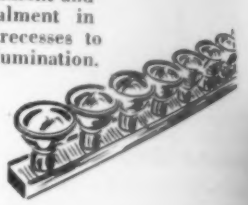
hanging louvered units

Pendant type louvered fixtures, designed for suspension from pipe stem hangers. Used in high ceiling situations where for practical reasons the fixtures must be hung below the ceiling.



cove light strips

Continuous row of lamps on suitable wireways, in compact arrangement and various designs for concealment in coves or other structural recesses to provide indirect general illumination.



engineering service

Kliegl systemized lighting is custom-planned to serve definite needs. Your requirements will be thoughtfully studied and recommendations offered as to the type of lighting and controls best suited to the situation. Our experienced designers will collaborate with your technicians or dramatic instructors in the development of lighting schemes and layout.

Advisory assistance is also available to architects and consulting engineers on technical aspects of plans for installation of the selected equipment.

KLIEGL BROS

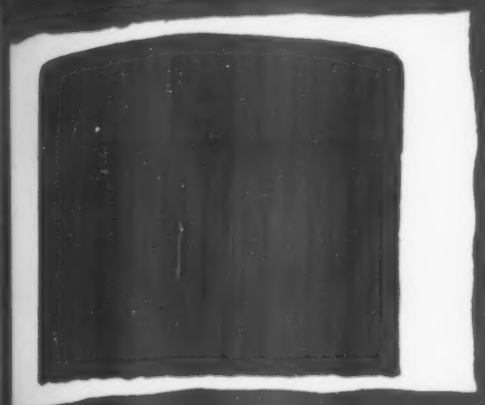
Universal Electric Stage Lighting Co., Inc.

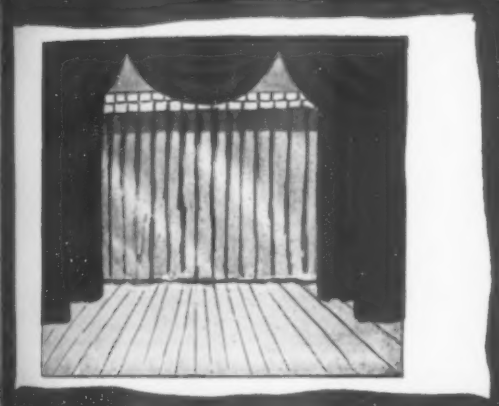
321 West 50th Street,
New York, N. Y.

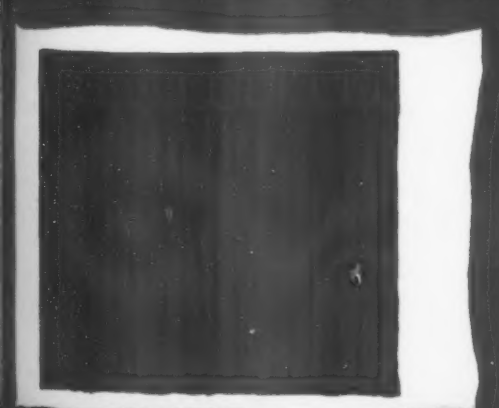
West Coast: Kliegl Lighting Company of California; 1060 West 6th Street, Los Angeles 17, Calif.

Originators and Manufacturers of Klieglights









DRAPERIES
STAGE CURTAINS
and
STAGE SETTINGS

• • •

Designed to fit your needs; expertly and accurately made for multiple uses.

•

35th year of service to public and parochial schools, town halls, little theatres, universities, hotels, banks, theatres.

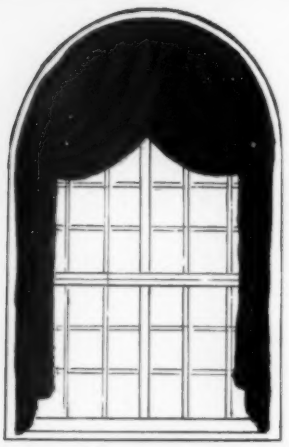
•

STAGE CURTAINS • SCENERY
ASBESTOS CURTAINS • RIGGING
CURTAIN TRACKS • DRAPERIES
FLAME-PROOFING • CLEANING
MUSLIN OR CANVAS
GELATIN • PAINTS
LIGHTING

•

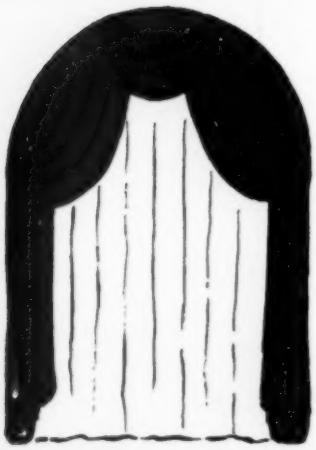
LITURGICAL CURTAINS

NOVELTY
Scenic Studios, Inc.



5

Overdraperies at auditorium windows serve to decorate the room and emphasize the architectural lines. Moreover they are used to darken the auditorium for showing of pictures and slides for visual education, and for daytime presentations of theatrical productions.



6

Shown in figure 5 is a set of tableau style overdraperies, fastened to the window frame and held up in the draped position by means of draw lines held to a brass or iron wall cleat.

Figure 6 shows overdraperies hung in a stationary fitted style with an extra darkening curtain.

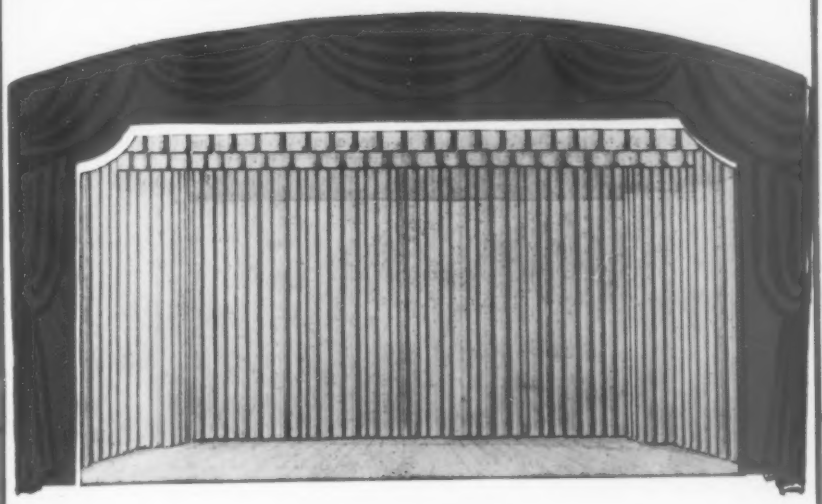


7

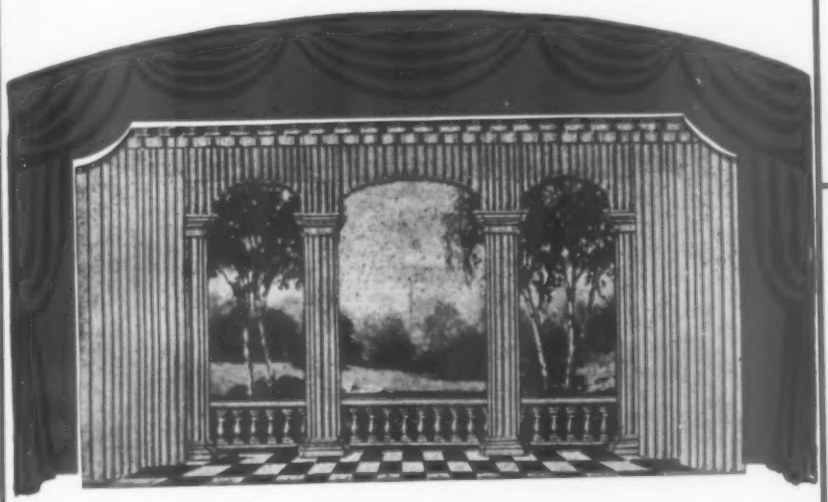
In figure 7 the treatment shown is a dignified and sedate valance and side drapery. If full draw curtains are desired the style of treatment need not be disturbed.

HELP YOUR ACOUSTICS WITH DRAPERIES

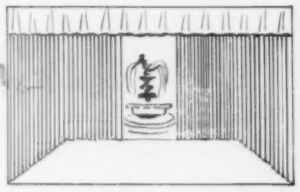
NOVELFLEX

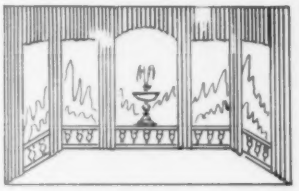


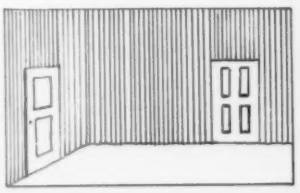
The basic cyclorama setting. A convenient background for conventional usage. To preserve its neutral characteristics, the cyclorama fabric is most frequently selected in beige or grey tones. Where adequate lighting equipment is supplied the cyclorama functions as a theatrical setting as well.

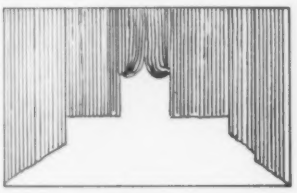


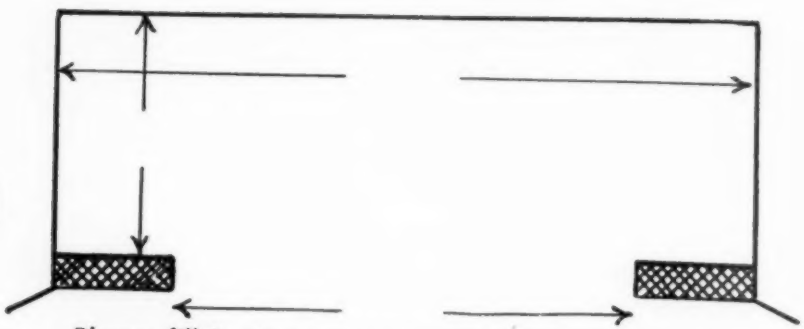
The NOVELFLEX setting is so named because of its great "flexibility". Simple or dramatic changes are easily and economically and quickly effected with existing facilities or the addition of contributing parts.





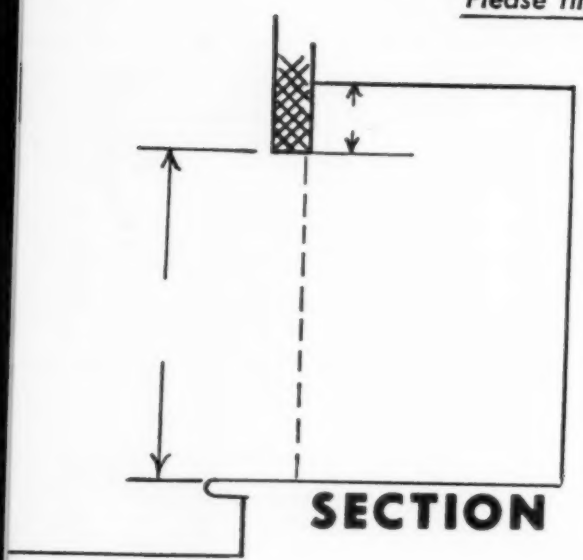




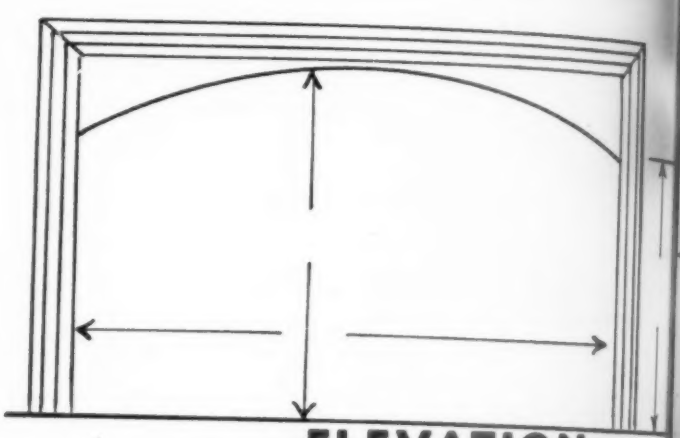


PLAN

Please fill in stage measurements between arrows

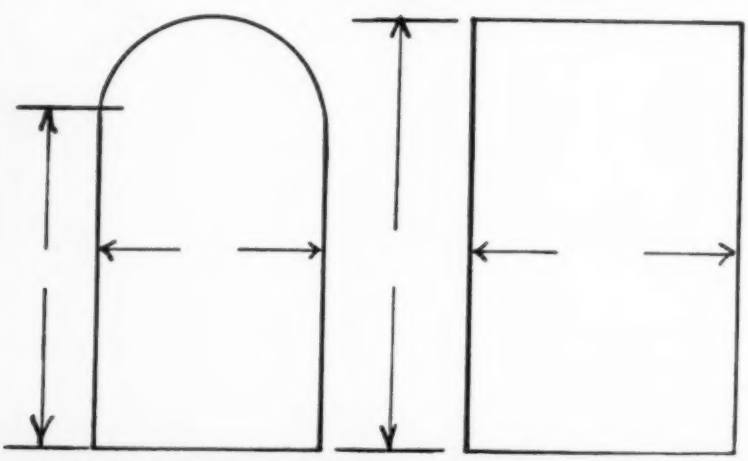


SECTION



ELEVATION

Please fill in window measurements between arrows



AUDITORIUM WINDOWS

State type and number of windows

Submitted by:

_____

_____

Name of Job:

_____

_____

NOVELTY

SCENIC STUDIOS, INC.

426-432 E. 91st ST., NEW YORK 28, N.

Telephone: TRafalgar 6-0800

Century

DOWNLIGHTS for auditoriums and classrooms

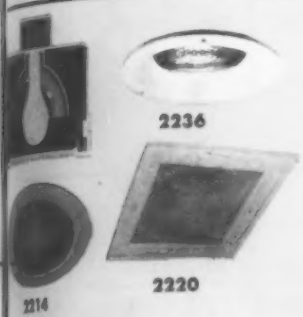
Open Reflector Type



Alzak reflectors give even and efficient distribution of light with complete cutoff of lamp and reflector brightness at 45°. Use low cost, long life general service lamps. 15° and 30° offset models for pitched ceilings (936, 960 series).

cat. no.	watts	lens or aperture size	height & access B=bottom T=top	ceiling opening	beam edge & spread S=soft H=hard	price
936	750-1000	8"	27½" T		S 90°	$77.00
939	750-1000	8"	27½" B	16¾"	S 90°	82.50
960	500	7"	22" T		S 90°	60.50
963	500	7"	21" B	14⅛"	S 90°	63.80
933	200-300	6"	13" T	12⅛"	S 90°	33.30
930	200-300	6"	13" B	12⅛"	S 90°	30.00
932	100	5¼"	9¾" B	8½"	S 90°	19.00

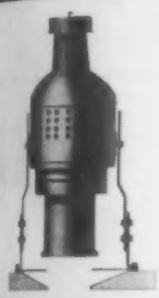
Flush Fresnelens Type



Highly efficient, even distribution of light with gradual cut-off. Low brightness from normal viewing angles. Use low cost, long life general service lamps. *Non-heat resisting lenses. All others heat resisting.

circular lens				square lens				pan recess lens			
cat. no.	watts	lens diam.	price	cat. no.	watts	lens diam.	price	cat. no.	watts	lens diam.	price
2214	200-300	14"	$35.00	*2220	200-300	12"	$26.00	2244	200-300	14"	$33.88
*2212	200-300	12"	28.25	*2221	150	8½"	20.00	2242	200-300	12"	29.15
2210	150	10"	21.00	2222	100	6½"	18.00	2240	150	10"	24.20
2202	100	8"	17.25					2238	100	8"	20.00
2201	40-75	6"	13.50					2236	40-75	6"	17.00
2203	40-75	3"	12.50					2233	40-75	3"	12.65

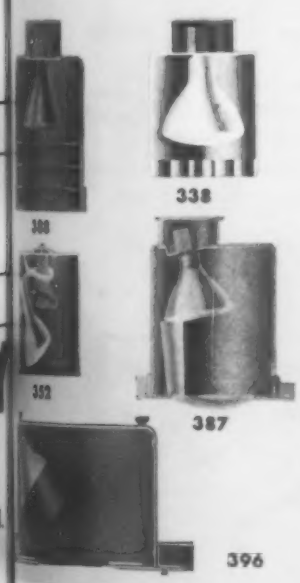
Optical Units; flush, built-in



A combination of small filament lamp, Alzak reflector and optical lenses gives efficient distribution of light through minimum size aperture. Beam can be framed precisely to required area.

cat. no.	watts	lens or aperture size	height & access B=bottom T=top	ceiling opening	beam edge & spread S=soft H=hard	price
1647	1000-2000	8"	38" T		H 20°	$106.70
1687	1000-2000	8"	38" B		max.	121.70
1646	250-750	6"	23½" T		H 27°	58.30
1686	250-750	6"	23½" B		max.	73.30
1645	250-750	4½"	22½" T		H 45°	53.90
1685	250-750	4½"	22½" B		max.	68.90
1654	250-400	3½"	17⅜" T		H 70° max.	66.55
1653	250-400	3½"	16½" B	14⅜"	H 70° max.	72.60
1651	100	1"	11" B	7⅛"	H 90° max.	44.00
1622	50 CP.	1½"	10½" T		H 90° max.	49.50
1623	50 CP	1½"	10½" B	7⅛"	H 90° max.	56.10

Internal Reflector Lamp Type



A concentric louver type and the patented Century Baffle unit. The latter creates an internal glow to match normal ceiling brightness.

396
45° Tilt, Concentric Ring Louvers

337
34° Tilt, Parallel Louvers

352
34° Tilt, Without Louvers

387
55° Spread Lens Counterlight

388	150	5¼"	11¼"	8½"	S 90°	16.00
338	150	6"	9½"	6⅞"	S 90°	11.50
*1664	20	1½"	9½" T		S 90°	26.40
*1665	20	1½"	9½" B	5¾"	S 90°	30.80

*The 1664 and 1665 units are 30 volt "Pinhole" downlights with built-in transformers. All lamp brightnesses cut off softly at 45°.

396	150	5¼"	8" B or T	12⅛"	S	36.30
337	150	8¾"	11¾" B	10⅜"	S	18.75
352	150	5¼"	10½" B	10⅜"	S	18.25
387	150	5¼"	11½" B	8½"	S	29.15

SPOTLIGHTS

Lekolites


1568

Alzak reflector. 4-way framing shutters or iris. Yoke and clamp or base. Heat-resisting plano convex lens. Asbestos leads. Sharp edge beam.

cat. no.	price	lens diam.	wattage	beam spread
1568	$121.00	8"	1000-2000	20° Max.
1575	82.50	8"	250-750	16° Max.
1591	60.50	6"	250-750	27° Max.
1581	55.00	4½"	250-750	45° Max.

3000 Watt Follow Spot


1540

Replaces noisy, clumsy arc lights. Internal yoke, blower, iris and vertical shutters. Finger-tip controls. Castered stand. AC or DC.

cat. no.	price	lens diam.	wattage	beam spread
1540	467.50	12"	3000	12° Max.

Fresnelites


514

Patented Fresnelens gives soft edge spot or flood of light. Alzak reflector. Yoke and clamp or base. Asbestos leads.

cat. no.	price	lens diam.	wattage	beam spread
514	132.00	14"	5000	15° to 45°
510	82.50	10"	2000	15° to 45°
506	59.40	8"	1000-1500	15° to 45°
500	22.00	6"	250-750	13° to 50°

Fresnelite Jr.


1211

Streamlined cast aluminum housing. Alzak reflector. Yoke and base. 3 foot cord and plug.

cat. no.	price	lens diam.	wattage	beam spread
1211	18.00	3"	75-150	16° to 40°

STRIPLIGHTS

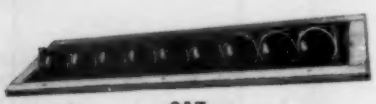
Borderlights


414

Individual Alzak reflectors. Wired on 3 color circuits. Chain hangers. Combination holders with heat resisting glass color roundels. Splice box.

cat. no.	price	length	wattage	outlets
411	On application	To order	100	6" O.C.
413		To order	200-300	8" O.C.
414		To order	300-500	12" O.C.

Footlights


817

Disappearing type. Individual Alzak reflectors. Mercury switches. Wired on 3 color circuits. Splice box. Heat-resisting glass color roundels.

cat. no.	price	length	wattage	outlets
816	$96.80	5' 2"	100	12
817	102.35	5' 2"	100	9

"Paint With Light" Strip


391

Ideal for background lighting. 55° spread lenses in red, blue, and green. Use PAR-38 or R-40 spot lamps.

cat. no.	price	length	wattage	outlets
394	71.50	4' 6"	150-300	9
391	95.70	6'	150-300	12
397	119.63	7½'	150-300	15

FLOODLIGHTS



1502

Beamlite Projectors

Narrow beam with parallel rays for simulating sunlight, moonlight, and for side lighting. Alzak reflector, yoke and "C" clamp. Hinged front for colorframe or diffuser.

cat. no.	price	size	wattage	beam edge and spread
1502	$60.50	16" diam.	1000-2000	12° to 18°
1515	52.80	10" diam.	250-750	8° to 14°

Wide Angle Units

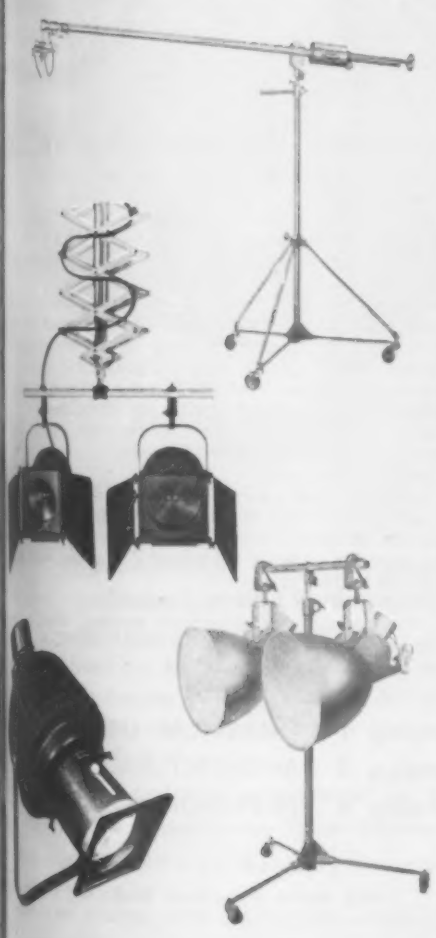


1305

Soft edged, wide spread of light. Matte finished aluminum or Alzak reflector, yoke and clamp. Holder for color-frame or diffuser.

1305	38.00	16" diam.	750-2000	Soft, wide
2927	14.50	10" diam.	250-400	Soft, wide

SCHOOL TV STUDIO LIGHTING



Black and White and Color

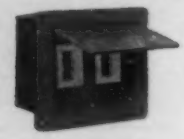
The modern school's emphasis on television studio training demands the careful planning of experienced Century lighting engineers who will propose the combination of lighting and controls suitable for students' operation.

Century engineers are accustomed to planning efficient systems in keeping with present and foreseeable requirements. Studios of modern schools, along with the newest, largest and most advanced of the great network television studios are equipped by Century Lighting. While the problems of lighting these studios are indeed unique and unprecedented, Century engineers have produced the most advanced lighting instruments, controls and mounting devices available and are constantly at work on improvements and additions to meet ever increasingly precise requirements.

This equipment is fully described in Century Catalog #4, Television Lighting, and various other Century TV publications which include useful information on the design of studio lighting and control systems.

Correct evaluation of the future lighting requirements of the studio—the additional load imposed by Color TV, for example—is essential in planning the studio layout. Century is able to offer valuable planning assistance, in the design of large and small studios.

MISCELLANEOUS



Flush Pockets

	Wall Type		Floor Type	
	cat. no.	price	cat. no.	price
1 way & plug	3101	$13.20	3091	$13.20
2 way & plug	3102	24.20	3092	24.20
3 way & plug	3103	35.20	3093	35.20
4 way & plug	3104	46.20	3094	46.20

50 Amp. stage plug type. Century has a complete line of wire, cable, plugs, switch boxes, connectors, etc. The devices listed here are representative of a much broader line.



Exit Sign

cat. no.	price	wattage	size
2297	$29.15	15-100	19¼" x 13½"
2305	6.05	10	5" diam.

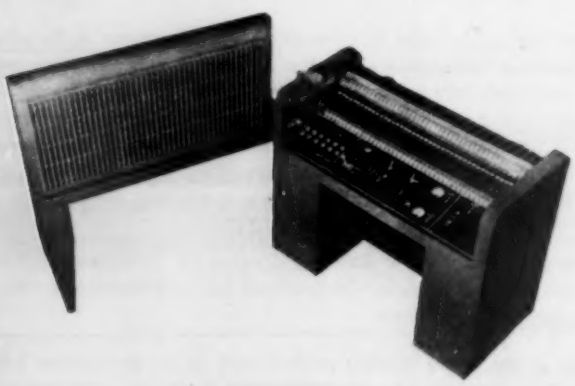
Recessed. Brushed chrome or bronze frame.

CONTROL SYSTEMS



Auto Transformer

Basically, a switchboard is an assembly of dimmers and switches; but other elements may be added which will greatly increase the flexibility and usefulness of the individual controls. Such switchboards are made up in two types: Portable and Fixed; and each of these may in turn be of several forms. Fixed switchboards are invariably more complex than the smaller portable units, and are manufactured to specifications and on order only. Individual dimmers may be of the resistance or auto transformer types, tube-reactor controls, all electronic controls, or a combination.



Century Izenour Electronic (C-1 Board)

The control elements of this Century System consist of:
A) tube and transformer racks
B) a control desk or console
C) an adjacent pre-set panel
D) a panel for cross-connecting all load circuits with all control circuits

The console, preset, and cc. panel occupy a relatively small space and may be located wherever convenient for the operator to view the studio. The tube and transformer racks where actual control of the load currents takes place, are set in a basement or vault where space is not at a premium.
This system offers a number of singular advantages:
—extremely flexible. Multipresets may be added, at relatively little expense, to the basic units or circuits.
—wide loading ratio
—controls closely grouped for simplicity of operation
—fading and proportional dimming done manually or through an electrically controlled, motor driven timer
—console may be ordered as presently needed, and additional controls added as needed
There are 14 Century sales engineers throughout the U.S. available to visit and help solve your problem. Write for this free service.

for a complete listing of lighting equipment and accessories in your field, send for

catalog 1 THEATRICAL LIGHTING
catalog 2 ARCHITECTURAL LIGHTING
catalog 4 TELEVISION LIGHTING

CENTURY LIGHTING, INC., 521 West 43rd Street, New York 36 • 626 North Robertson Blvd., Los Angeles 46

FRANK ADAM ELECTRIC CO.

P. O. Box 357 • St. Louis 3, Missouri

INCLUDE THIS *Popular Feature* in your SCHOOL AND COLLEGE AUDITORIUM PLANNING



Clayton High School, Clayton, Missouri — Wm. B. Ittner, Inc., Architects and Engineers — Equipped with two (FA) Class 870-C2 Controlboards.



(FA) STAGEBOARD for manual switching and dimming.

Stage Lighting CONTROL SYSTEMS

(FA) Stage Lighting Control Systems add substantially to the color, beauty and utility of all types of Auditoriums — large or small.

The result of more than 50 years experience and technical "know how", (FA) Stage Lighting Controls embody the latest features in design and construction.

Built on the unit basis, (FA) Control Systems can be made to fit any type and size of Auditorium. All bear the Underwriters Laboratories' seal of approval, and will give long-lasting and trouble-free service.

The next time you are called upon to plan a school, college or other auditorium, include a (FA) Stage Lighting Control System in your specifications. Your nearest (FA) representative, listed in Sweet's, will be glad to discuss full details with you. Or, write for Bulletin 801.

(FA) produces the following types of Stage Lighting Equipment

CONTROLBOARDS for Manual Control • Modified Pre-Set Remote Control • Multiple Pre-Set Remote Control • Motor Driven Control • Electronic Tube Control • Mobile Color Lighting Control.

DIMMING CONTROL EQUIPMENT — Resistor Type • Auto-Transformer Type • Reactor Type.



(FA) PILOT BOARD for electronic tube system with Reactance Dimmers, which provide preselective lighting intensity with almost instantaneous reaction to the operation of the control element and a dimming control system capable of controlling a wide range of connected loads on each circuit.

Makers of: BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

AUTOMATIC DEVICES COMPANY

Allentown, Pennsylvania

CURTAIN TRACK EQUIPMENT

for auditorium stages, classroom partitioning and audio-visual blackout window draperies

DRAPERY TRACK:

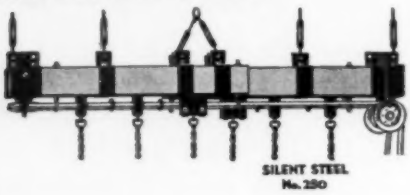


the new SPANOTRAC

Spanotrac is a truly exceptional light-to-medium duty drapery track. Available in aluminum, it is sturdy, durable, well-integrated and expertly engineered. It was specifically designed for darkening draperies in audio-visual classrooms and for partitioned classrooms in schools, churches and other institutions. The track shape size is approximately 1" x 1".

Spanotrac is installed single in one section with overlap accomplished by master carriers with extension arms passing by each other. Recommended for use with light-to-medium weight curtains. Carriers are supplied every 6" along track and include the ADC balanced carrier principle of two rubber wheels rolling on two parallel track treads. All pulleys are ball-bearing. Maximum overlap of master carriers is 8".

STAGE CURTAIN TRACK:



SILENT STEEL No. 250

SILENT STEEL

(for lengths over 36')

Track shape size: approx. 3" x 3"

Silent Steel track is the most highly developed stage curtain track on the market. Each carrier is of ball-bearing construction, assuring absolutely noiseless operation. Carriers supplied every 12". All pulleys are ball-bearing. Unlimited overlap. ADC balanced carrier principle: two rubber wheels rolling on two parallel track treads.



BESTEEL No. 170

BESTEEL

(for lengths up to 36')

Track shape size: approx. 2" x 2"

Besteel track is a smaller edition of Silent Steel. Recommended for use with medium-weight curtains. Carriers supplied every 12". All pulleys are ball-bearing. Unlimited overlap. ADC balanced carrier principle: two rubber wheels rolling on two parallel track treads. Also available with nylon ball-bearing carriers.

WINDOW CURTAIN TRACK (FOR LONG WINDOWS)



Fenesteel No. 260

FENESTEEL

(for lengths up to 36')

Track shape size: approx. 2" x 2"

Fenesteel track is recommended for use with medium-weight curtains on long window spans and small stages. Installed single in one section with overlap accomplished by master carriers with extension arms passing by each other. Carriers supplied every 12". All pulleys are ball-bearing. Maximum overlap: 18". ADC balanced carrier principle: two rubber wheels rolling on two parallel track treads. Also available with nylon ball-bearing carriers.

CURVED CYCLORAMA TRACK:



Section of Track Assembly

FLEX-I-TRAC
"walk around"

Track shape size: approx. 1 9/16" high x ⅝" wide

Flex-I-Trac "walk-around" is recommended where it is desirable to increase or decrease the stage size to afford a variety of settings. Carriers supplied every 9". Aluminum I-beam channel can be curved on-the-job to any degree or radius. No cord or pulleys utilized. Carriers of nylon construction; also available in ball-bearing.

BACK-PACK GUIDES: Prevents the curtain from accumulating in gathers until it reaches ends of the track. Providing a unique theatrical effect, Back-Pack allows the flat surface of the curtain to travel in that shape until it begins folding at the track ends. Attachments available for all ADC cord-operated tracks except Fenesteel.

Automatic Devices Company is also the manufacturer of the well-known Tom Thumb, Autodrape, Silver Service, Hercules, and Stop, Start and Reverse curtain machines. It also recently developed an all ball-bearing cord-operated curved track, and a new line of Pivot Arms called "Rotodraper."

"We Support the Most Celebrated Curtains in the World"

CAPITOL STAGE LIGHTING CO., INC.

527-531 West 45th Street, New York 36, N. Y.

"The Answer to Your Spotlight Problem"

The Capitol

No. 901 Spotlight



This Spotlight affords illumination that is clear, white and without flicker or noise. It can easily be focused from an 18″ head spot at 100 feet to flood a full stage with even light at the same distance. Yet it uses only a 1000 or 1500-watt T-20 prefocus-base long-life lamp, obtainable anywhere. It is the ONLY Mazda Spotlight with all these features:

1. 1000 or 1500 watt prefocus projector type bulb with double lens optical system for maximum brightness.
2. Truly round spot of even illumination formed by a precision Iris shutter.
3. Handle for following also instantly adjusts size of spot from head spot to flood.
4. Lever for masking top and bottom of light for special effects or when floodlighting.
5. Six independent colors, fingertip controlled, making possible other colors by combining two or more.
6. Built-in finger-tip controlled dowser for fadeouts—controlling brightness.
7. Convenient built-in double pole switch.
8. Designed for ease of operation and simplicity of control.

Send for your free copy of our latest complete Stage Lighting Catalog.

PRICE, COMPLETE
$250.00

Distributed by your Local Dealer

DAVID BOGEN COMPANY, INC.
401 West 13th Street, New York 12, N. Y.

YOU ARE THERE with a *Bogen* sound system





With a push of a button you achieve the goal of the modern educator: one-room schoolhouse intimacy in a building with hundreds of pupils, a personal relationship with youngsters you might otherwise never know. Use your Bogen sound system for 2-way intercommunication with any classroom, for distributing radio and recorded programs and activities or programs originating from any classroom, for making emergency announcements and for the many other applications that will occur to you in the course of the school day.

Bogen gives you this "one-room schoolhouse" intimacy for less than you think. Regardless of how much more you might spend, you cannot buy a more dependable or a more practical sound system. Bogen consoles give you all the functional features recommended by the U. S. Office of Education and make it possible for you to purchase only the equipment you actually need, thanks to modular design; each unit is complete in itself, but permits additions as your school grows. Some models also can bring about sizeable savings through eliminating the need for separate wiring and bells for the classroom change system.

Write for the complete catalog and for the name of your Bogen distributor. He can show you how to save money in planning your sound systems.

BOGEN IS THE COUNTRY'S LARGEST

AMERICAN SCHOOL AND UNIVERSITY—1954–55

DAVID BOGEN COMPANY, INC.

A BOGEN SYSTEM for every need

DUAL-CHANNEL CONSOLE MODEL "DU" SERIES

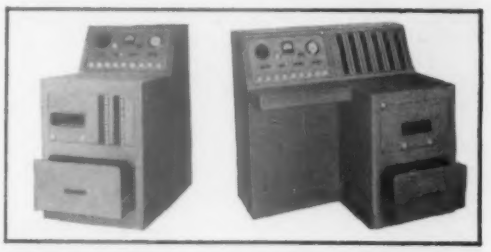
This series represents the fullest development of centralized sound system technique. The two-channel feature means that a radio program may be distributed to one class, a second radio or record program to another class – while at the same time intercommunication may be carried on with a third classroom. Features include: four microphone inputs, tape recorder input, two remote telephone line inputs, exclusive room pickup feature, high fidelity radio tuners (AM-FM or AM), phonograph, remote control of two inputs; classroom privacy feature and annunciator indication of room calling are optional.



BOGEN DU 72 WITH 2 TUNERS

SINGLE-CHANNEL CONSOLE MODEL "SCH" SERIES

Similar to the Bogen "DU" series but designed for schools that require only a single channel for radio or record programs. Intercommunication can be carried on with any classroom simultaneously. Features include: three microphone inputs, tape recorder input, remote telephone line input, exclusive room pickup feature, high fidelity tuner (AM-FM or AM) and phonograph; classroom privacy feature and annunciator indication of room calling are optional.



BOGEN SCH 30 BOGEN SCH 90

TABLE MODEL "TM" SERIES

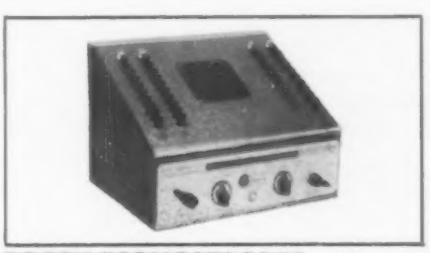
Single complete unit provides all essential central control school services at moderate cost. Single channel 30 watt amplifier provides for program distribution and intercommunication (not simultaneously). Two microphones can be mixed or faded with phonograph or radio. One or more rooms can be reached at one time. Sets permanently for privacy or non-privacy operation. AM radio tuner may be replaced with AM-FM at extra cost. Built-in 3-speed record player.



BOGEN TM40

ECONOMY "SA" SERIES

Ideal for small schools, small budgets. Built-in 10 watt amplifier provides for program distribution, intercommunication, emergency announcements, classroom initiation of calls. Built-in monitor speaker serves as microphone. Your own radio or phonograph may be hooked to unit. Teachers may originate calls to control unit by voice or by addition of inexpensive IA annunciator system. Sets for privacy or non-privacy operation.



BOGEN ECONOMY SA40

TRANSCRIPTION PLAYERS

The VP17 and VP17X portable transcription players are equipped with the new Bogen variable speed control which permits you to slow down or accelerate the three nominal speeds. This variable-speed feature makes the Bogen player ideally suited for a variety of school uses: in music, speech and language classes, during dancing periods and at gym sessions.



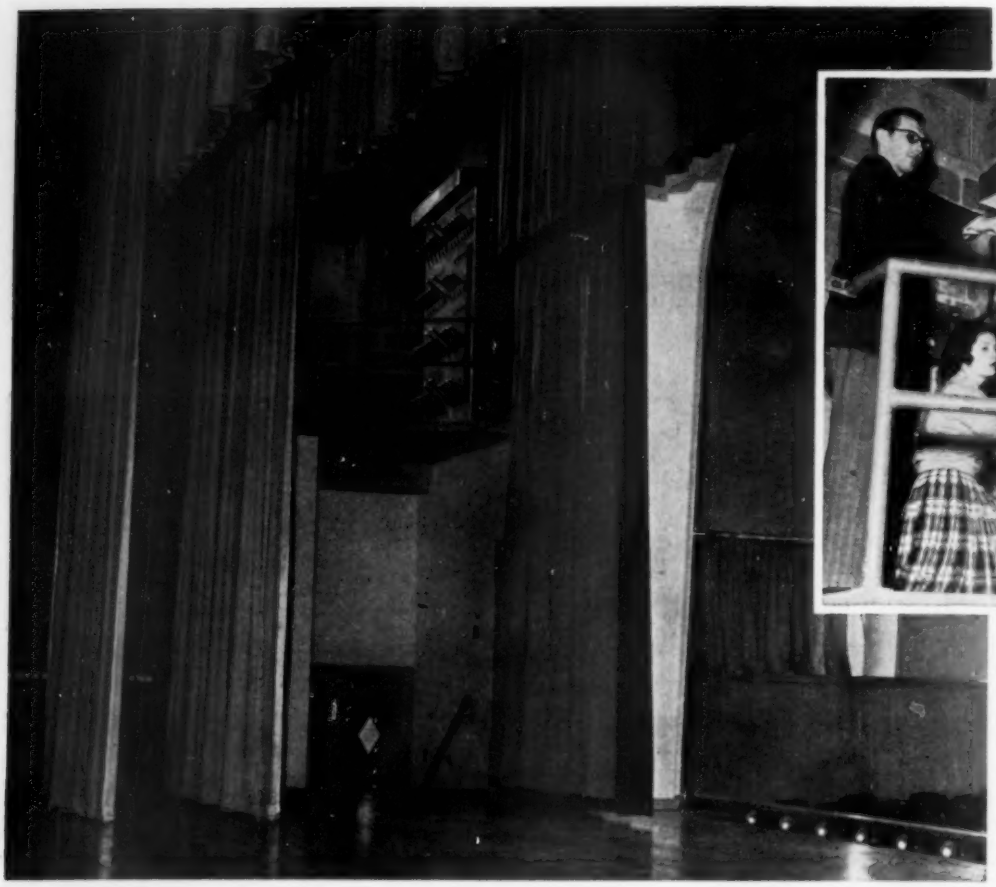
MODEL VP17

MANUFACTURER OF SOUND SYSTEMS

DISTRIBUTION ASSEMBLIES DEPARTMENT

General Electric Company

41 Woodford Avenue, Plainville, Connecticut





Stage of Marywood College Theatre, Scranton, Pennsylvania, showing Controlite control board in wings. *Above:* Mr. George Perry of the College's Drama Department instructs undergraduates in the intricate lighting sequences required in the ambitious musical, "Brigadoon."

Professional Stage Lighting with Student 'Stage Gang' using

General Electric 'Controlite'

Controlite, the lighting control system selected for world-famous entertainment installations*, is equally at home in the school or university theatre and auditorium. Its controls are so easily understood that students soon achieve professional results.

Whatever type of dimmer control is desired – resistance, auto-transformer or electronic – and whatever the size requirement, we can engineer and custom-build exactly the right switchboard for the job, at lowest cost. Years of experience assure complete satisfaction . . . and you can count on the availability of our complete and expert engineering service for years to come.

For complete information, write General Electric Company, Distribution Assemblies Department, 41 Woodford Avenue, Plainville, Connecticut.

* *Such as the Marine Stadium at Jones Beach, Long Island, and Convention Hall, Philadelphia.*



Students adjust two of the ten spotlights used for "specific lighting" of upstage areas. These lights are individually controlled by Controlite.

GENERAL ELECTRIC

HUB ELECTRIC COMPANY

2255 West Grand Avenue, Chicago 12, Illinois

Engineered STAGE LIGHTING AND CONTROLS

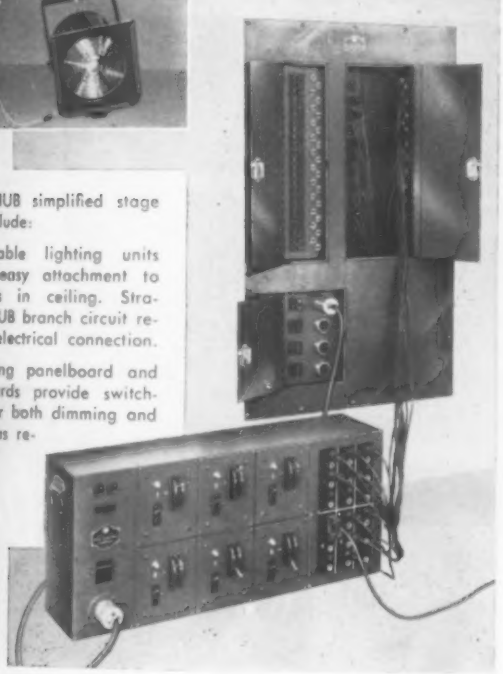
HUB SIMPLIFIED SYSTEM OF STAGE LIGHTING FOR ELEMENTARY SCHOOLS

A new approach to an old problem permits the equipping of small stages in elementary schools and similar institutions with a type of stage lighting and control heretofore unattainable except at a cost that was prohibitively large. The system offers the following advantages:

- Variety of lighting effects—subject to both switching and dimming control.
- Applicable to existing stages as well as new construction.
- Initial installation at minimum cost.
- Expansibility with full utilization of original equipment.
- Easy, convenient mounting facilities for lights and other stage equipment without damage to stage walls or ceiling.
- Cost may be shared through "pooling," since switchboards and lighting equipment are portable.
- Safe—even when operated by untrained students.

The system is fully described in HUB Bulletin ES-54. Copy furnished on request.





Elements of the HUB simplified stage lighting system include:

Items—HUB portable lighting units with fittings for easy attachment to mounting channels in ceiling. Strategically located HUB branch circuit receptacles provide electrical connection.

Right—HUB plugging panelboard and portable switchboards provide switching control only, or both dimming and switching control, as required.

STAGE SWITCHBOARDS

For High Schools and Colleges





Illustration shows a typical example of a HUB electronic stage switchboard. This and other types of stage switchboards are described in HUB Catalog SB-51. Copy sent on request.

STAGE LIGHTING

HUB manufactures a complete line of stage lighting and accessories—borderlights, footlights, spotlights, floodlights, plugging strips, floor pockets and wall pockets. For descriptive information on this equipment, write for Bulletin LS-54.



OTHER HUB PRODUCTS

HUB also manufactures aisle, step and emergency lights, directional and exit signs, gymnasium, corridor and office lighting. Literature and data sheets available.

KNOXVILLE SCENIC STUDIOS INC.

Old Maryville Pike, Knoxville, Tenn.

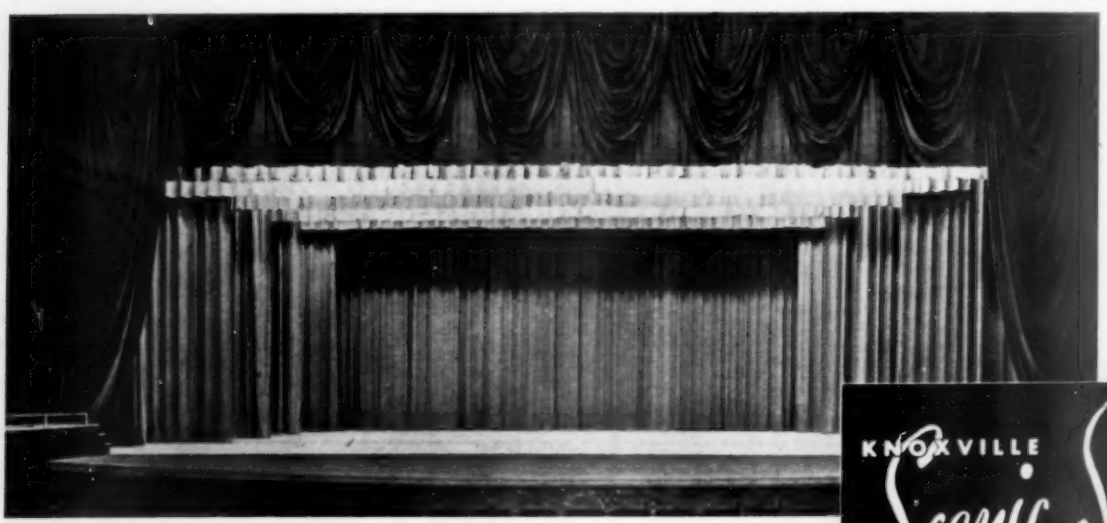
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BELOW: Stage scenery, hand-painted at Knoxville Scenic Studios and installed by workmen noted for their skill.



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ABOVE: Dade County Civic Auditorium, Miami, Florida. Stewart & Skinner, Architects.

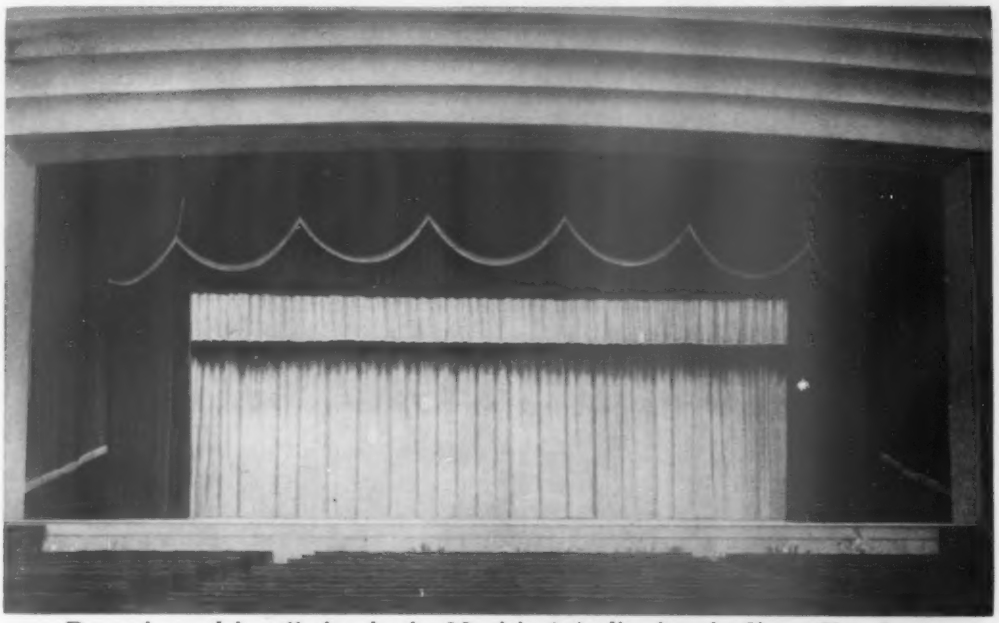
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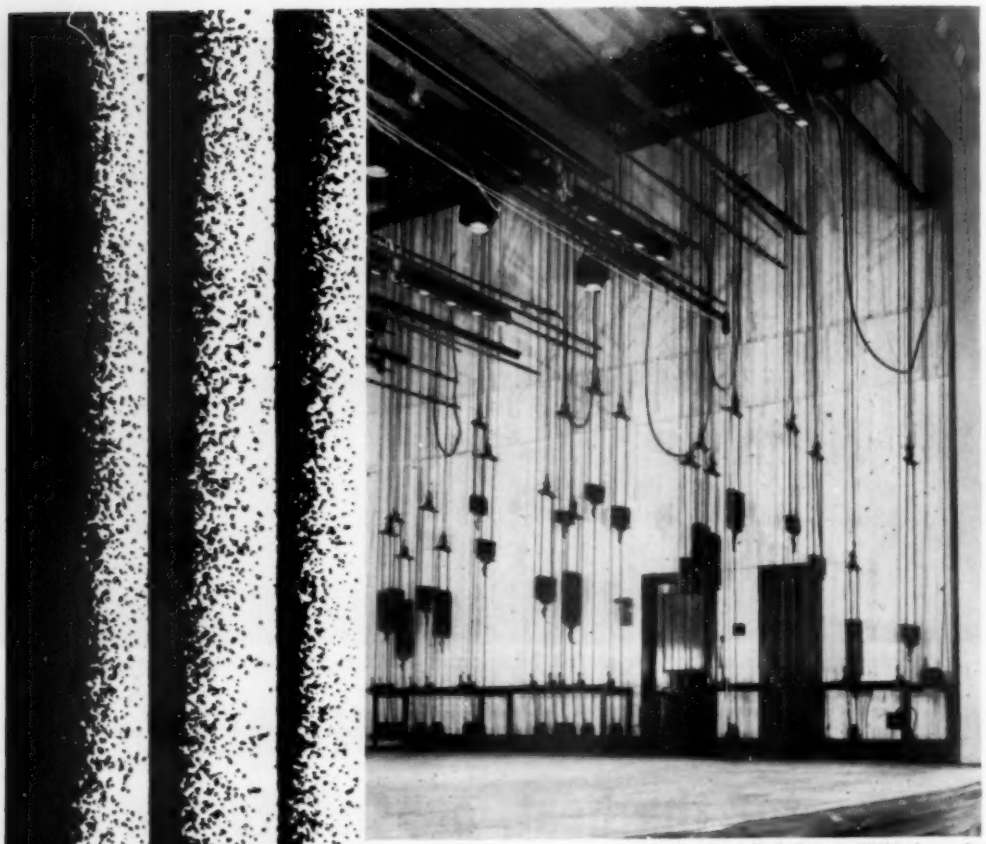
Yes, if you're looking for highest quality stage equipment plus expert design and construction Northwest has the answers. Economical answers too. Many years of experience have resulted in a complete understanding of the staging problems faced by those building or remodeling auditoriums, schools and theaters. This experience is your guarantee of years of trouble-free operation and the best in design and appearance.

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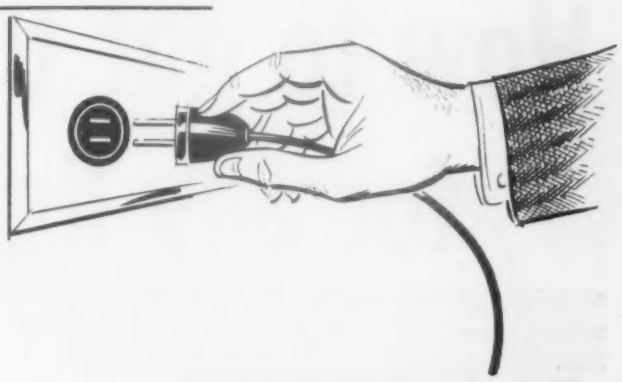
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Especially useful where it is desirable to maintain daylight or artificial illumination for taking lecture notes, or where it is impractical or uneconomical to provide curtains or shades.

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WARD LEONARD ELECTRIC COMPANY

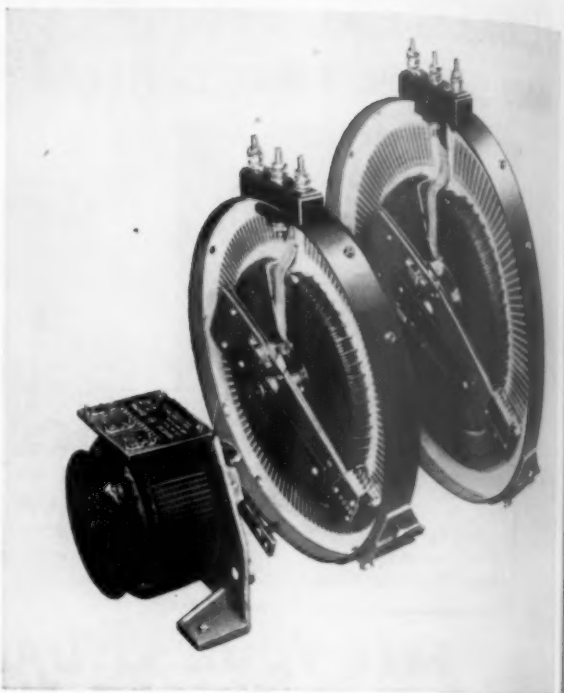
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AUTO-TRANSFORMER DIMMERS come in 2500, 6000 and 8000 watt sizes, 120 volts, 60 cycles A.C. Foolproof dimmers, capable of operating singly or in many combinations with interlocking to common master systems. Exclusive features include silver-surfaced brush track for low contact resistance and long, trouble-free life. Complete details in Bulletin 76.

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WARD LEONARD'S HYSTERSET DIMMER. New electronic circuits, using small current values and miniature control devices, permit grouping many dimming and switching controls in single control board for one-man operation. Various circuits can be interlocked electronically. Pre-set control permits pre-selection of two or more lighting combinations or scenes in advance. Write for Bulletin 74.

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WARD LEONARD'S VITROHM. Inexpensive assemblies for small theaters and auditoriums, schools, churches, and lodge rooms provide low-cost, flickerless dimming. Non-interlocking, single- or multi-plate assemblies: Bulletin 71. Interlocking assemblies with group, color and grand master control: Bulletin 72.

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Our prompt, efficient service, low prices, high quality workmanship and materials guarantee satisfaction and savings. Let us know your requirements and we will gladly submit samples, sketches, plans, prices, etc., without charge.

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BUCKEYE GLIDE CO.

29 East 21 Street, New York 10, N. Y.

BUCKEYE SPRING-KUSHION GLIDES
'HEAVY DUTY'

Quiet Moving on All Floors, Including Stone

NOISELESS FURNITURE GLIDES

FOR EVERY TYPE CHAIR — DESK — TABLE — WOOD OR METAL

Buckeye Spring-Kushion Glides are designed to stay attached to the furniture. Also to help prolong its use.

The deep hardened steel cap takes all the wear and gives years of service. Within and below the rubber cushion lies the heat tempered coil of spring steel. The hardened cap is highly polished and nickel plated.

BE SURE TO SPECIFY "THE ULTIMATE IN GLIDES" ON ALL NEW FURNITURE



TYPE N

FOR WOODEN FURNITURE

These two types can be supplied in the following diameters:

#116–¾"	#206–1¼"
#136–⅞"	#356–1½"



TYPE B

For metal furniture complete with nuts and lock washers.

Our "TMR" is designed to snap into tubing and lock inside by means of a tempered steel spring—this device can be supplied on any diameter glide—



TYPE TMR

The "TMR" is made to fit the following tubing:

⅝" O.D.	⅞" O.D.
¾" O.D.	1" O.D.

SEND FOR CATALOGUE AND PRICE LIST
SAMPLES ON REQUEST



TYPE P

TO REPLACE CASTERS

Type DS—Glides are furnished with hardened thread cutting shank. Will securely hold in ⅜" metal or thicker.

These two types can be supplied in the following diameters:

#206–1¼"	#356–1½"



TYPE A

TO STOP WOBBLE

Type DSN—Glides are fitted with hardened drive screw nail. These will hold firmly in laminated wood.

FAULTLESS CASTER CORPORATION

DEPT. SU-54-55

REPRESENTATIVES IN PRINCIPAL CITIES **Evansville, Indiana** CANADIAN FACTORY: STRATFORD, ONTARIO

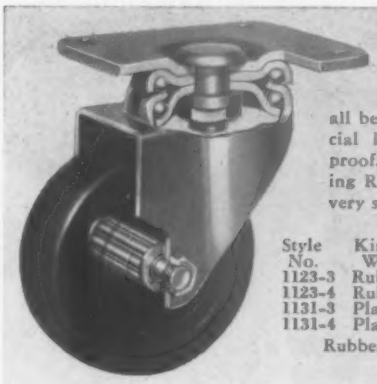


FAULTLESS DOUBLE BALL BEARING CHAIR CASTERS

Designed especially for use on chairs in offices, study rooms and libraries, where quiet is essential. Of superior construction, this caster has two full rows of hardened ball bearings swiveling freely in uninterrupted raceways. Low over-all height, dust-proof construction. Bearings lubricated at factory. Furnished with either Ruberex (cushion tread) or Plaskite (hard tread) wheel. A very easy swiveling caster.

Style No.	Kind of Wheel	Diam. of Wheel	Wt. Per Set of 4
2478	Ruberex	1⅝″	1 Lb. 3 Oz.
2479	Ruberex	2″	1 Lb. 8 Oz.
2378	Plaskite	1⅝″	1 Lb. 3 Oz.
2379	Plaskite	2″	1 Lb. 8 Oz.

Packed one set in a box.
Size Bore ⅜″ x 1″.



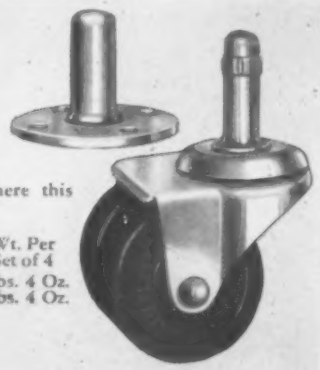
Faultless Light Duty Truck Caster has two complete ball races, using best grade balls, all bearing surfaces hardened, special king pin construction, dust-proof. Furnished with Roller Bearing Ruberex or Plaskite wheels. A very strong, durable caster.

Style No.	Kind of Wheel	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
1123-3	Ruberex	3″	3 x 3	175
1123-4	Ruberex	4″	3 x 3	225
1131-3	Plaskite	3″	3 x 3	300
1131-4	Plaskite	4″	3 x 3	350

Rubber Tired Wheels available

FAULTLESS DOUBLE WHEEL PIANO CASTER

This double wheel, double ball bearing, noiseless Piano Caster has two rows of ball bearings operating in lubricated hardened raceways. Used with No. 98 socket. Wood Ferrule for use over socket for large drilled hole. Supplied with a plate, where this type is needed.



Style No.	Diam. of Wheel	Kind of Wheel	Wt. Per Set of 4
EW479-2	2″	Ruberex	2 Lbs. 4 Oz.
EW379-2	2″	Plaskite	2 Lbs. 4 Oz.

Size Bore ⅜″ x 1½″.
Packed one set in a box.

This Faultless Rigid Truck Caster is a desirable companion to the 1100-Series. Made of extra heavy gauge steel. The 1700-Series Rigid and 1100-Series Swivel Casters have the same mounting hole positions and same over-all height, for interchangeability and quick replacement.



Style No.	Kind of Wheel	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
1723-3	Ruberex	3″	3 x 3	175
1723-4	Ruberex	4″	3 x 3	225
1731-3	Plaskite	3″	3 x 3	300
1731-4	Plaskite	4″	3 x 3	350



FAULTLESS DESK CUPS

Faultless Ruberex or Rockite Desk Cups are of nonbreakable, rust-proof composition, in a harmonizing brown shade.



Round Shape Desk Cups

RUBEREX Style No.	ROCKITE Style No.	Wt. Per Set of 4
RDC4 138	RDC7 138	5 oz.
RDC4 158	RDC7 158	7 oz.

Square Shape Desk Cups

RUBEREX Style No.	ROCKITE Style No.	Wt. Per Set of 4
SDC4 112	SDC7 112	6 oz.
SDC4 134	SDC7 134	7 oz.
SDC4 200	SDC7 200	13 oz.
SDC4 258	SDC7 258	15 oz.

Packed one set in a box.



FAULTLESS DOUBLE BALL BEARING MEDIUM DUTY TRUCK CASTER

This Faultless Ball Bearing Swivel Caster is a companion caster to the 7700-Series Caster Furnished with Rubber Tired, Ball Bearing Wheel.

Style No.	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
3317-5	5″	3″ x 6″	500
3317-8	8″	3″ x 6″	500

FAULTLESS CUSHION CHAIR GLIDES

FAULTLESS Cushion Chair Glides are made of hardened steel with cushion rubber insert insulation. Rounded corners permit chairs to be moved easily over floors. Drives on the chair with hammer. No holes to drill. Packed 6 sets in a box.





Flexible Cushion Chair Glide

Style No.	Diameter of Base
CNS 078	⅞″
CNS 116	1⅛″
CNS 114	1¼″
CNS 112	1½″

Cushion Chair Glide Spring Clip Socket

Style No.	Diameter of Base
ORS 078	⅞″
ORS 116	1⅛″
ORS 114	1¼″
ORS 112	1½″

FAULTLESS MEDIUM DUTY RIGID PLATE CASTER

This Faultless Rigid Plate Caster is a companion caster to the 3300-Series Faultless Swivel Plate Caster. The heights are identical with the 3300-Series. It has a full drawn, formed, heavy gauge, steel horn. Furnished with Rubber Tired, Ball Bearing wheel.



Style No.	Diam. Wheel	Mounting Hole Spacings	Lbs. Cap. Each
7717-5	5″	2⅜″ x 4″	500
7717-8	8″	4⅛″ x 4½″	500

THE BRUNSWICK–BALKE–COLLENDER COMPANY

623 South Wabash Avenue, Chicago 5, Illinois



The most exciting line of school furniture ever . . . winner of the Industrial Design Institute Award for designer Dave Chapman & Associates.

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Modern Styling
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Steel Pylon Construction

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...ademic seat for comfortable, dynamic ...turns on silent nylon bearings—allow... ...ward and egress in one natural motion. ...ed sloped working surface of birch ...Generous leg, knee and body room. Vis... ...book storage space on die-formed ...equipped with rubber-cushioned metal ...The desk provides complete height range ...from 7 through 12. (Also available with ...surface top.)





FREE ILLUSTRATED FOLDER

Write for No. 445 Folder fully describing the design, construction and adaptability of this brand new and modern unit. Dept. 13.

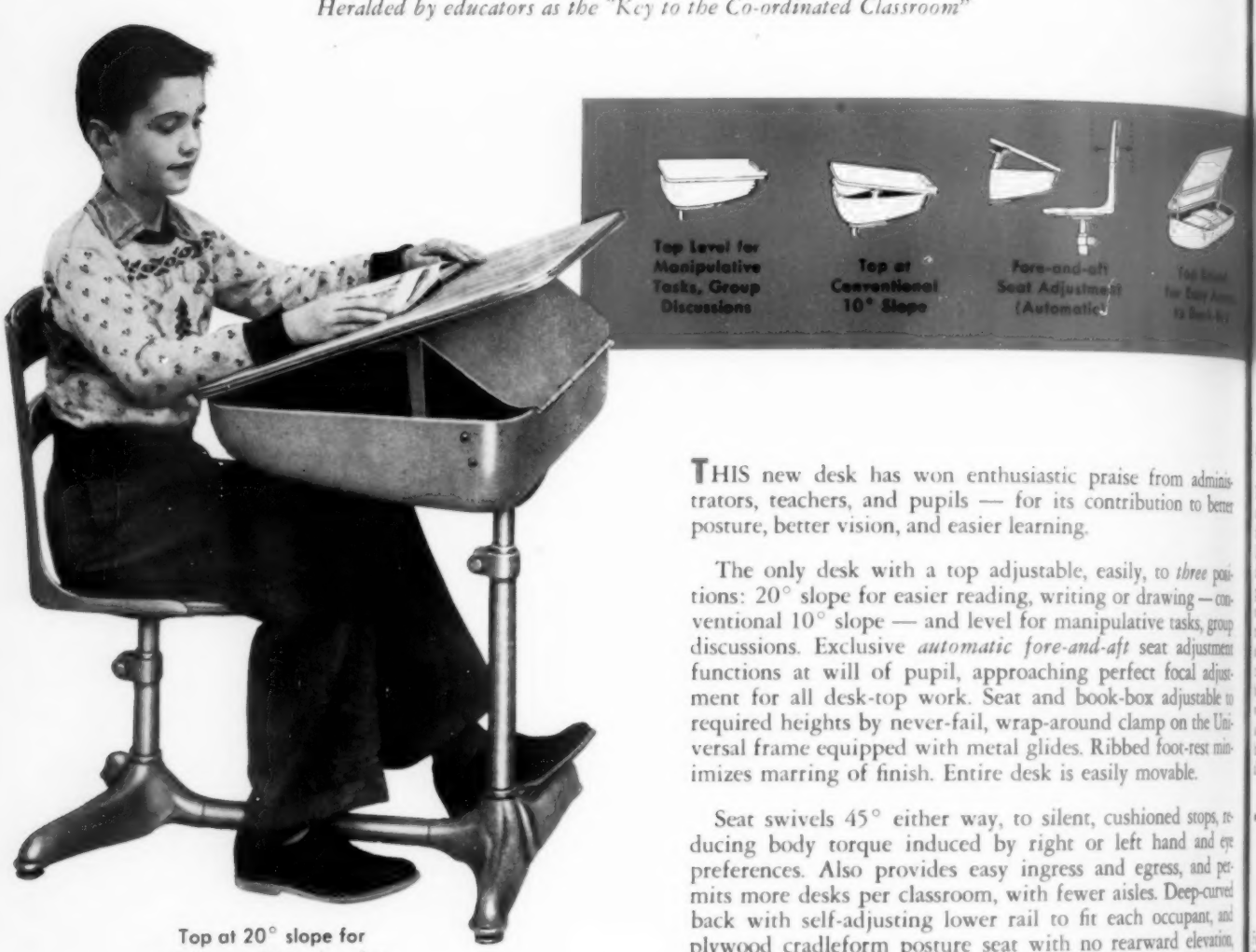
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Leading the school-seating industry for over 65 years, American Seating Company has pioneered many improvements in school furniture which have since become the accepted standard. Continuous research and rigid inspection procedures safeguard the quality of all American Seating products. Finest materials and most modern methods insure the true economy found only in long, dependable service. Buy any of these products with complete confidence of satisfaction.

American Universal "Ten-Twenty" Desk No. 436

Heralded by educators as the "Key to the Co-ordinated Classroom"



Top at 20° slope for reading, writing, drawing

THIS new desk has won enthusiastic praise from administrators, teachers, and pupils — for its contribution to better posture, better vision, and easier learning.

The only desk with a top adjustable, easily, to *three* positions: 20° slope for easier reading, writing or drawing — conventional 10° slope — and level for manipulative tasks, group discussions. Exclusive *automatic fore-and-aft* seat adjustment functions at will of pupil, approaching perfect focal adjustment for all desk-top work. Seat and book-box adjustable to required heights by never-fail, wrap-around clamp on the Universal frame equipped with metal glides. Ribbed foot-rest minimizes marring of finish. Entire desk is easily movable.

Seat swivels 45° either way, to silent, cushioned stops, reducing body torque induced by right or left hand and eye preferences. Also provides easy ingress and egress, and permits more desks per classroom, with fewer aisles. Deep-curved back with self-adjusting lower rail to fit each occupant, and plywood cradleform posture seat with no rearward elevation, promote relaxed sitting with freedom to perform.

Roomy, one-piece, die-formed steel book-box has round-rolled edges, smooth, rounded lines. Generous knee and leg room. Hot-press urea-resin bonded plywood top, 20¼" x 24". Tamperproof housed mechanism. Full-length pencil tray inside box. (Inkwell is optional.) Wood parts durably lacquered in natural-birch finish. Metal parts dipped in beige, special-formula, alkyd-urea-type enamel, and baked. Three sizes, to accommodate all grades — and adults. (Also available with plastic-surface top.)



FREE BOOKLETS

Write for "Education Grows" and "The Co-ordinated Classroom"—two informative works on recent educational developments.

ALSO CATALOGS — Complete School Furniture catalog on request. Write Dept. 13.

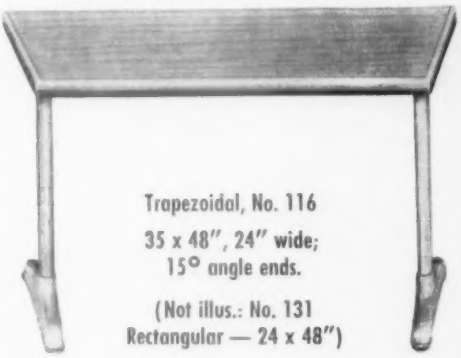
American L-shaped and Trapezoidal and Rectangular

FLEXI-TABLES



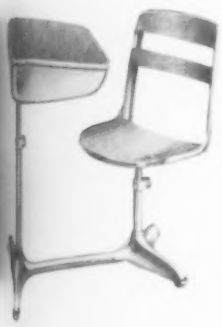
L-shaped, No. 115
48" lengths, 24" wide.

Developed to meet widening variety of classroom teaching activities. Used with individual desks for greatest variety of table arrangements for groups of all sizes. Only "Flexi-tables" provide maximum work surfaces, with a minimum floor space and greatest teaching flexibility. Space may be gained by fitting L-shaped "Flexi-tables" in "extra" corners, and Trapezoidal "Flexi-tables" along clear wall. Twin, oval-shaped supporting standards make ingress and egress easy. Heights: 21, 23, 25, 27, 29". Have 1½" solid metal glides; rubber shoes available. Plywood tops in natural-birch finish. (Two-compartment, plywood book-compartments available.)



Trapezoidal, No. 116
35 x 48", 24" wide;
15° angle ends.

(Not illus.: No. 131
Rectangular — 24 x 48")



American Universal Desk No. 434

The popularity of this desk is based on its functional advantage of flexibility and comfort. Famous American universal features include one-piece, die-formed steel book-box, with large plywood lid usable in level position or at 10° slope; full-length pencil tray inside box. Cradleform posture seat swivels 45° either way to silent, cushioned stops. Desk and seat heights adjustable with never-fail, wrap-around clamps. Three sizes, to accommodate all grades—and adults; have metal floor glides. (Also available with plastic-surface tops.)



American Single-Pupil Tables No. 324 and No. 329

No. 324 with Lifting Lid. Strong, plywood top, usable level or at 10° slope. Roomy, one-piece, die-formed steel book-box and oval, twin steel standards leave ample knee and leg room.

No. 329 with Open Box. Overhung plywood top permits pushing several tables tightly together when a large, flat work surface is desired. Roomy one-piece steel book-box.

Full-length pencil tray inside the book-boxes. (Also available with plastic-surface tops.)



American Single-Pupil Table No. 328 with No. 368 chair has the "Ten-Twenty" Book-Box

Has the famous, 3-position plywood top: 10-20° slopes for reading, writing and other visual tasks; also level top for manipulative and group work. One-piece, die-formed steel book-box has full-length pencil tray inside box. (Also available with plastic-surface top.) Heights: 21, 23, 25, 27 29". Note No. 368 Chair—description on next page.

American Universal Adjustable Tables No. 132

For kindergarten thru college; also cafeterias, dormitories, libraries. Tops are heavy, cored plywood. Steel standards have simple leveling and adjusting device, providing different heights and accommodation to floor irregularities. Book compartments available, on either or both sides—except for 24" x 48" on one side only. Two-compartment unit for 48" tables; three-compartment for 60", 72".

Top Sizes	Adjustable Heights (inches)									
	With Low Standard					With High Standard				
24 x 48"	21	22	23	24	25	25	26	27	28	29
30 x 60"	21	22	23	24	25	25	26	27	28	29
30 x 72"	21	22	23	24	25	25	26	27	28	29
36 x 72"	21	22	23	24	25	25	26	27	28	29



Plywood on all American desks, tables and chairs hot-press urea-resin bonded.

American Envoy
Posture Chair No. 368



All - purpose chair, designed for good - posture sitting and best economy. Monosteel frame, multiple welded for great strength—no rivets, no squeaks. Formed plywood seat, deep-curved back with self-adjusting lower rail to fit each occupant. Plywood seat and back. Seat heights: 11, 13, 15, 17".

American Envoy
Tablet-Arm Chair No. 380



Like the No. 368 chair and the Envoy desk, this unit is designed for good-posture sitting and economy. Plywood tablet-arm is sloped for comfortable writing. Roomy, sanitary book cabinet. Enclosure panel on occupant's right is optional. Seat height, 17" only. Also available: No. 378 — without book-compartment. (Also with plastic-surface arms.)

American Envoy
Desk No. 362



Strongest, most comfortable desk of its type; 10° slope of plywood top assures ease in reading, writing. Strong desk support and wrap - around clamp for quick height adjustment of top. Roomy, sanitary book cabinet. Enclosure panel for book cabinet at right of occupant is optional. Seat heights: 13, 15, 17". (Also available with plastic-surface top.)



American Study Desk No. 431

Comfortable study desk for Senior and Junior high-school use. Access from either side affords maximum classroom capacity. Plywood top is sloped 10°; V-type pencil groove. Non-swiveling cradleform seat. Seat, top adjustable in height. Bookrack under desk top optional. (Also with plastic-surface top.)



Pedestal Tablet-Arm Chair No. 472

Cradleform, plywood seat is 17" high, with closed, deep-curved back. Plywood tablet-arm sloped for writing comfort. Oval steel pedestal. Book-rack is optional accessory. Chair No. 471 identical except has open back, with self-adjusting lower rail. (Also available with plastic-surface arm.)



All-Purpose Folding Chair No. 54

Comfortable, durable—for assembly halls, cafeterias, gyms, etc. Frame of reinforced triangular steel tubing; shaped plywood seat. Metal parts Bonderized; two coats of enamel; tread-rubber feet. Folds quietly, compactly. (Also with shaped-steel or upholstered seats, Nos. 53 and 56, respectively.)



Bodiform Auditorium Chair No. 16-001

Combines beauty, comfort, roominess. Automatic, ¾ safety-fold seat action—more room for passing, cleaning. No pinching or tearing hazards. Upholstery easily replaceable. (Other American auditorium chairs available with plywood back and seat; also wood-upholstered; and with tablet-arm.)

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(Also branches at Flagstaff, Mesa, Prescott, Safford, Tucson, Yuma)

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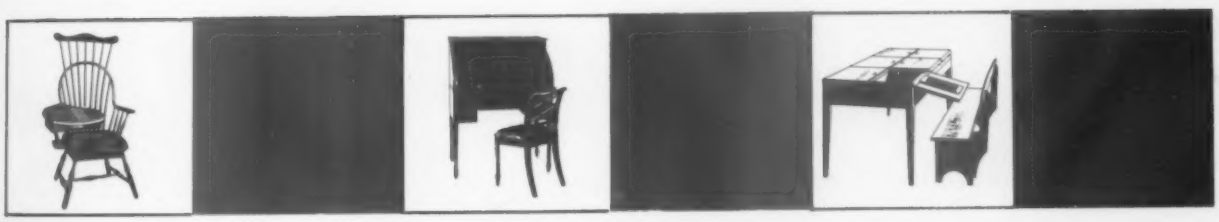
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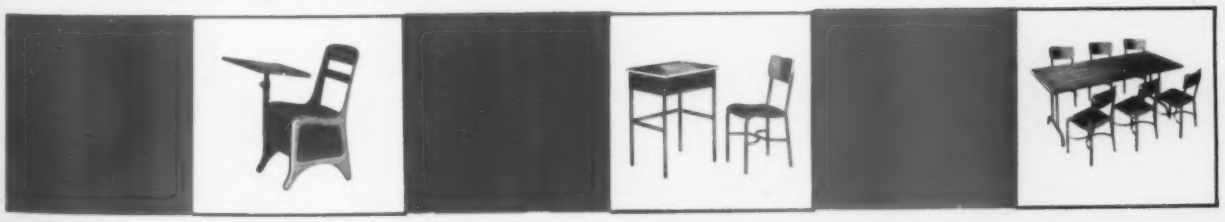
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GRIGGS modern school seating Catalog



reat Chairs live forever



RIGGS seating lasts

Griggs Equipment Co., Box 630, Belton, Texas

GRIGGS Skyliner Seating

Sets the Pace for Modern School Furniture

SKYLINER NO. 500 CHAIR DESK

Smooth, modern lines . . . beautiful, sparkling colors typify this most graceful of all chair desks – the GRIGGS No. 500. Students like the Skyliner for its correctly-postured comfort; schools like the long-lasting qualities that make their investment a better value. Heavy gauge steel welded frames, sturdy tubular steel desk top support. Hardwood plywood tops and seats; top faces of Formica available. Book compartments available with fourth panel. In 13, 15, and 17" seat heights . . . three-inch desk top adjustment.



Skyliner No. 500 Chair Desk.

A Wide Choice of Colors Makes GRIGGS Seating Different!

Only with Griggs school seating can you select – at no extra cost – from five modern metal finishes plus handsome wood finishes. Wood will be finished in handsome natural or school brown; metal colors offer a choice of beige, taupe, coral, sage green, or ocean blue! Match seating colors to your classroom's decorating scheme.



No. 450 Chair Desk — Similar to No. 500, features different top adjustment.

Choose the Skyliner Tablet Arm Chair for the Finest!

The most modern, the most beautiful tablet arm chair made. An excellent choice for lecture halls . . . adult classrooms. Available with or without book compartment. Roomy 24 by 12-inch desk top supported by sturdy, curved support allowing easy access to seat. All corners smoothly rounded to protect clothing. Hardwood plywood seat, tablet arm, and back. High quality, deep drawing steel frame. One-piece heavy gauge steel sides. In 17-inch seat height only.



Skyliner No. 520 Tablet Arm Chair.



Complete Your Modern Seating with Skyliner Chairs

Thoroughly comfortable, sturdily-constructed modern chairs for classroom, lecture hall, library, or "extra" seating. Made with the same graceful lines and lasting qualities of other Skyliner furniture. Chairs are available in 11, 13, 15, and 17-inch seat heights to meet seating requirements of all grades from kindergarten through college.

GRIGGS

Pioneer Seating *Gives Your Classroom Modern Seating—Economically!*



Pioneer No. 200 Chair Desk

Sturdy, substantial seating with built-in comfort – that's the Pioneer Chair Desk. Scientifically-curved back and seat encourage correct posture. Roomy, easily accessible book box. Frame of heavy, die-formed steel electrically welded into a rigid unit. Desk top support formed of 1" tubular brace for extreme strength. Durable hardwood plywood top, seat, and backs. In 13, 15, and 17-inch seat heights for all grades.

Pioneer No. 220 Tablet Arm Chair

Provide your lecture halls and adult classrooms with tablet arm chairs that will give you the lasting seating you need – at an economical price! Heavy, die-formed angle steel frame is electrically welded. Hardwood plywood seat, back, and large 12 by 24-inch tablet arm. Rounded design of tablet arm prevents snagging and tearing of clothing – makes it easy for students to get in and out of chair. In 17-inch seat height only. With tough steel book box.



NEW! Airliner Study Top Desk

Study Top Desk No. 780-A

Brand-new, lightweight design study top desk with Griggs' own features that make it the best buy in this type of seating. Tubular right front leg extends from desk top to the floor, giving positive support. Large, roomy desk top of hardwood plywood . . . is 22 by 17 inches. Roomy side book compartment formed of sturdy tubular steel. Made in 13, 14, 15, 16, 17, and 18-inch seat heights that adapt this new desk to every classroom! In all Griggs' five metal and two wood finishes, and may be topped with colorful, long-lasting Formica if desired.

GRIGGS *Airliner* Tubular

Tubular Seating Lasts . . . Is Easy to Clean

Airliner tubular furniture is lightweight seating of a functional design for all grades from kindergarten through college. Tables with matching chairs are furnished for one or two pupils; are available with or without bookshelves. Any school considering the purchase of furniture for any room should examine the beautiful, easily-moved, Airliner design.



Airliner No. 720-A Tablet Arm Chair.

Airliner No. 720 Tablet Arm Chair with book rack.

Airliner Tablet Arm Chairs

Classrooms and lecture halls sparkle when equipped with these handsome tablet arm chairs of modern, tubular construction. Two models – without book rack, and with a steel grill book rack – give a school a variety of choices in selecting their tablet arm chairs. The rounded tubular legs have no rough edges – preventing snagging and scratching. Bookshelves have rolled steel edges. The roomy tablet arm, 24 by 12 inches, is of sturdy hardwood plywood. Tubular frame is finished in baked-on enamel. In two seat heights: 17 and 18 inches.

Color Story

GRIGGS Colors . . . Formica Finishes . . . Brighten Any Classroom

Airliner tubular furniture . . . like all Griggs' school furniture . . . can be selected in five standard metal finishes; beige, taupe, coral, sage green, or ocean blue; and two wood finishes: either natural or School Brown, at no extra charge! Also, consider . . . as so many schools have . . . gleaming, wear-resisting Formica desk tops. Easy-to-clean Formica tops are practically impervious to scratches, pencil marks, ink, paste, etc. . . . making them a top investment for any school.

Airliner No. 740 Tubular Chairs

The ideal chair for all school uses! Perfect for use with tubular desks, in cafeterias, classrooms, study halls . . . wherever chairs are needed in a school! Thousands are in schools today, for their beautiful appearance, their lightweight, easy mobility appeals to everyone seeing them! Sturdy welded tubular construction with curved leg bracing that provides maximum leg room. Curved, hardwood plywood seats and one-piece backs. In eight seat heights from 11 to 18 inches to answer every seating need . . . in *every* grade.



Furniture Provides Lightweight Durability

Equip Your School with the Best — the Airliner No. 700 Desk

Thousands of Airliner No. 700 Desks have been placed in classrooms across the country, for schools realize the practical sturdiness of this fine desk means years of satisfactory wear. Tubular leg construction with roomy leg space; strong, embossed side panels of heavy-gauge steel join to make a lasting unit. The wide open front of the bookshelf permits easy access . . . the maximum in convenience to the user. The roomy 18 by 24-inch hardwood plywood desk top gives unhampered work space – all these features combine in a desk with modern lines and universal appeal.

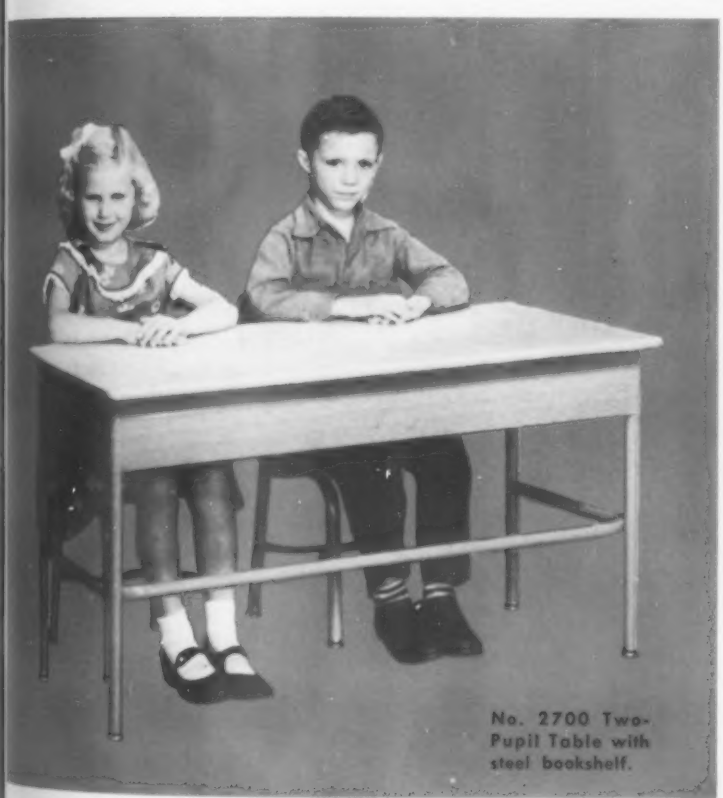


Airliner No. 700 Table with No. 740 Chair.

"Lift-Lid" Desks Mean Neater Book Compartments

Lift-lid style desks provide an entirely enclosed book box . . . pupils keep neater compartments when all parts of storage space are accessible. The Griggs' lift-lid desk is of superior design assuring quiet and easy operation of the top. Two hinges provide smooth opening and hold top erect when raised, prevent slamming on fingers. Sturdy tubular construction welded to book compartment of heavy-gauge embossed steel for a rigid, wobble-free, long-lasting frame. Available in ten top heights from 20 to 29 inches.

Airliner No. M 750-L Lift-Lid Table. Shown with steel bookshelf.



No. 2700 Two-Pupil Table with steel bookshelf.

Two-Pupil Tables for Larger Work Spaces

Preferred in many classrooms, the Airliner Two-Pupil tables avoid waste aisle space in room planning. Each pupil has a roomy work space on table top . . . a separate book compartment for storage. Tough tubular steel legs and frame are welded into a rigid unit with the addition of a stout, embossed steel book compartment sides and shelf. Table is also available with hardwood plywood bookshelf. Heavy, 7-ply desk top gives years of service, may be faced with Formica for wear resistance. Top size is 20 by 44 inches; desk heights are from 20 to 29 inches.

GRIGGS Complete Table Line



Airliner No. 1800
General Purpose
Table.

Airliner General Purpose Tables . . . Useful . . . Economical . . . Long-Lasting

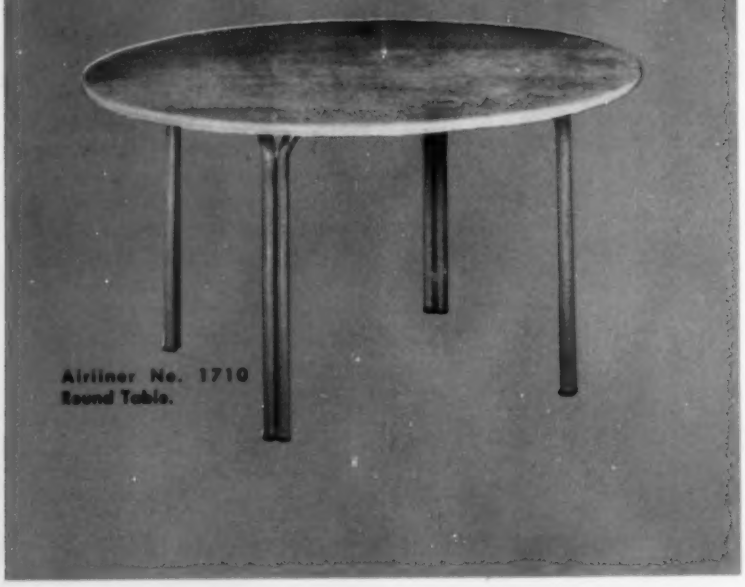
Airliner tables are heavy-duty tables . . . designed and constructed to take the heavy wear of classrooms, laboratories . . . wherever tables are wanted. Tough, tubular steel frame that harmonizes with Airliner tubular chairs. Built-up, fine quality wood tops with solid maple bands, or Formica tops with aluminum bands are available. Table top sizes are 24 by 48 inches; table heights are from 20 to 30 inches. Finished in your choice of Griggs' five metal and two wood colors.



Airliner No. 1800
Six-Pupil Table.

Larger Airliner Tables Are Built to Take the Wear of Heavy, Daily Use

Larger Airliner tables are especially designed to meet the table needs of lunch and study rooms, libraries. Available with or without book compartments, these larger tables can be immediately adapted to group study if necessary to convert lunchrooms into classrooms. Heavy welded tubular steel construction. Top sizes range from 24 by 48 to 34 by 72 inches. Up to six book compartments may be ordered on larger tables. Built-up wood tops with solid maple bands, or Formica tops with aluminum bands are available. Available in heights from 20 to 30 inches.



Airliner No. 1710
Round Table.

GRIGGS Round Tables Are Ideal for Group Study

Excellent for study halls or group discussions; recommended by many modern educators, Griggs round tables are the finest choice when this style table is to be used. Four, double, heavy-gauge tubing legs are welded into a rigid one-piece frame to give great strength to the completed table. Round tables are available in two top sizes, of 42 and 48-inch diameter, and in heights from 20 to 30 inches. Tops are beautifully finished, or may be faced with wear-resisting, long-lasting Formica.

Meets Every School Need...

Airliner Folding Table Is Tops for School or Church Use

Gymnasium space is quickly and easily converted to study space with this new, positive-locking Griggs Airliner Folding Table. Rigid when erect, this fine table meets every requirement desired by school maintenance personnel; it is extremely rigid when erected, yet smoothly folds for easy stacking. Hardwood blocks protect each corner; hold tables apart and protect leg mechanism when stacked. Table tops in 6 and 8-foot lengths, made of hardwood plywood or faced with Masonite or Formica.



Airliner No. 1000 Folding Tables.

New hinge guides legs smoothly into folded position and locks them in place. Legs cannot move when folded, cannot get into way while stacking.

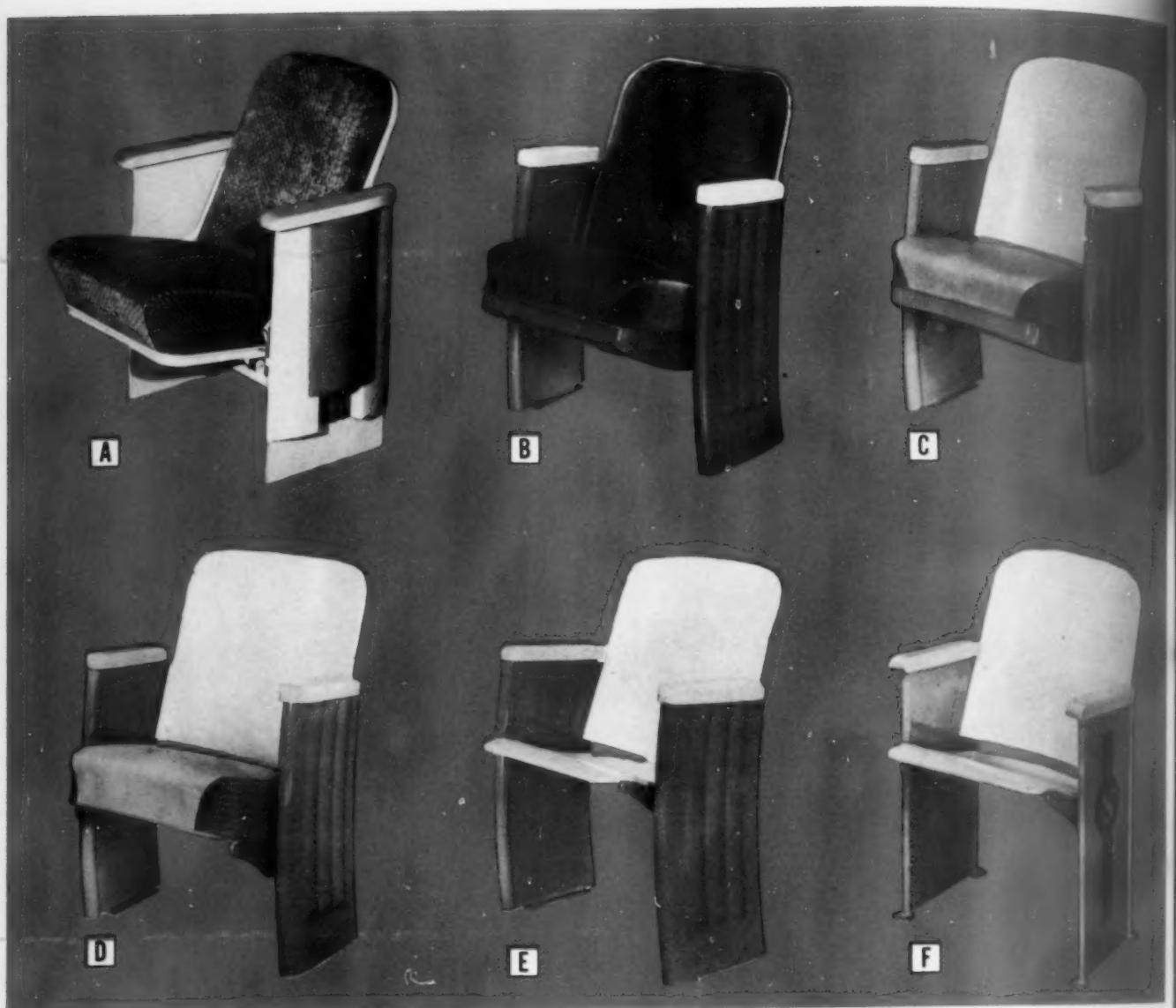


Airliner No. 1860 Adjustable Tables.

It's Brand New! Airliner Adjustable Height Table Can Be Used in All Grades

Yes . . . one table can fit several school grades . . . if it's the new Griggs Adjustable Table. No need to figure your table requirements exactly . . . include several adjustable tables in your table order, and they can be quickly set for the height needed. Two models, one adjustable from 20 to 25 inches; the second adjustable from 25 to 30 inches. Tops available in 24 x 48, 30 x 60, and 34 x 72 inch sizes. Simple locking adjustment nut in each leg is easily loosened, legs telescoped or extended to desired height. Heavy tubular leg construction, built-up tops of wood with facings of Formica available.

GRIGGS offers the Most Complete Line of Auditorium Seating Made Today!



A Now! Griggs makes the original, genuine "Push-Back" Chair – the push-back auditorium seat that permits curved seating plans. Designed for the finest auditoriums, this handsome chair permits movement from inner seats to aisle without disturbing others. Seated patrons push back, allowing plenty of passage room. Fully upholstered models only, in a wide variety of fabrics.

B **Griggs Model 50 MBW Chair.** The finest conventional type auditorium chair made. Luxurious, fully upholstered seat and back. Available in a wide choice of rich fabrics. Modern, curved end standards. Exceptionally sturdy one-piece, solid-steel center standards. Automatic rising seat. Back is entirely enclosed in one-piece, embossed metal back plate. Solid maple arm rest.

C **Griggs Model 50 BW Chair.** Constructed in the same fine design as the Model 50 MBW Chair, this thoroughly-modern auditorium seat has a deep-cushioned upholstered seat and the curved, hardwood plywood back. Curved end standards. Strong, solid steel center standards are solid all the way to the floor. Automatic rising seat. Solid maple arm rests.

D **Griggs Model 71 BW Chair.** Designed to give the benefits of modern design and comfort to your auditorium. Combines the luxury of an upholstered seat with a curved plywood back. Modern curved end standards. Solid steel center standards prevent breakage. Manually-operated seat operates smoothly on heavy duty hinge bracket. Maple arm rests.

E **Griggs Model 71A Chair.** For modern seating that's economically priced, choose the Model 71A Chair. Graceful, curved end standards add beauty to your auditorium; correctly-curved hardwood plywood seat and back bring comfort. Solid steel center standards give long-lasting wear. Maple arm rests.

F **Griggs Model 12A Chair.** Low in price, yet sturdy in construction – that's the Model 12A Chair. End and center standards of tough, one-piece steel construction with rolled edges to add strength. Available with upholstered seat or with curved plywood seat and back. Maple arm rests.

NATIONAL *Line of Multi-purpose* SCHOOL FURNITURE

Featuring

NATCOLITE TOPS SURFACED WITH NEVAMAR

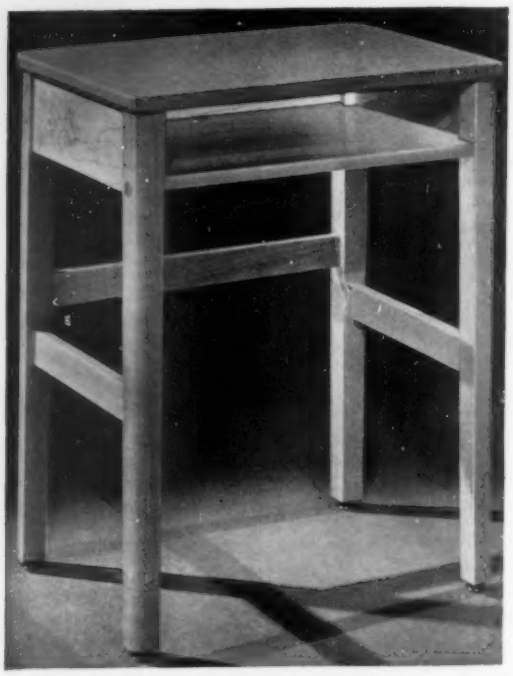
HERE is a complete line of multi-functional school equipment, designed to offer all the advantages inherent in modular coordination. Each item is conceived as a distinct educational tool, fully interchangeable with every other item, to allow for an infinite variety of uses and arrangements. The entire line has been designed with the counsel and cooperation of outstanding teachers and architects to meet the requirements of modern teaching techniques. It is adaptable to varying curricular needs and changing classroom situations, in standard sizes, from kindergarten through college age. Every desk and table in the National line has the Natcolite school top, surfaced with NEVAMAR plastic laminates in wood grain patterns, specially developed and tested for uniform, optimum light reflectance and banded with matching Wynene plastic edging. It assures years of satisfactory service and eliminates maintenance problems, because it never needs refinishing.

NATIONAL SCHOOL FURNITURE COMPANY

DIVISION OF NATIONAL STORE FIXTURE CO., INC.

ODENTON, MARYLAND

NATIONAL LINE OF MULTI-PURPOSE SCHOOL FURNITURE



NATIONAL SCHOOL DESK

Made with the Natcolite laminated plastic school top — never needs refinishing, eliminates maintenance problems. In two finishes: Honey Maple and Silver Maple. Heights: 20 to 30 inches, in 1-inch gradations.

No. 2020 Deluxe Series — Of finest Northern Maple, all joints lock-pinned with wood pegs, slanting book shelf, steel tie-rod construction.

No. 2120 Standard Series — Made to exacting specifications of leading school systems.



NATIONAL SCHOOL CHAIR

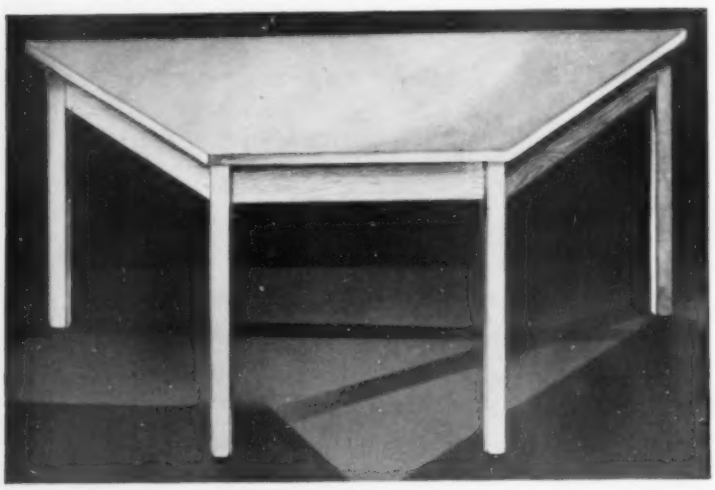
GUARANTEED FOR 5 YEARS

Against any defects in material or workmanship

All parts subject to greatest stress — back posts, back rest, and seat frame — are built of electronically laminated plywood for superior strength, lightness and resilience. Designed for correct, healthy posture. In Honey Maple and Silver Maple. Book-rack optional. Heights: 10 to 18 inches, in 1-inch gradations.

No. 2610 Deluxe Series — Finest Northern Maple

No. 2710 Standard Series — Close-grained Hardwood



NATIONAL TRAPEZOIDAL MULTI-MODE TABLE

No. 2330

Revolutionary in design, this exclusive National table has been developed by one of America's leading educators as a special educational tool to further group activities on the primary, secondary and college level. It is adaptable to an infinite variety of group arrangements, utilizing two, three, six, eight and ten tables. Natcolite plastic school top. Choice of Honey Maple or Silver Maple finish. Heights: 20, 23, 26, 29-inches.

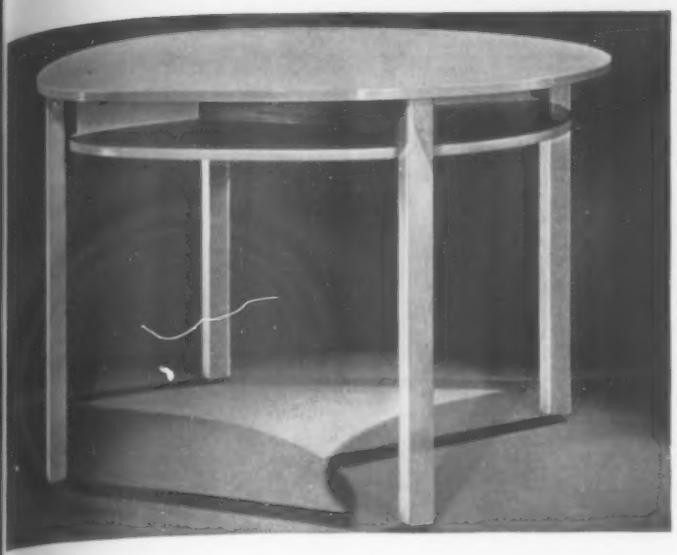








NATIONAL LINE OF MULTI-PURPOSE SCHOOL FURNITURE



NATIONAL ROUND TABLE

No. 2320

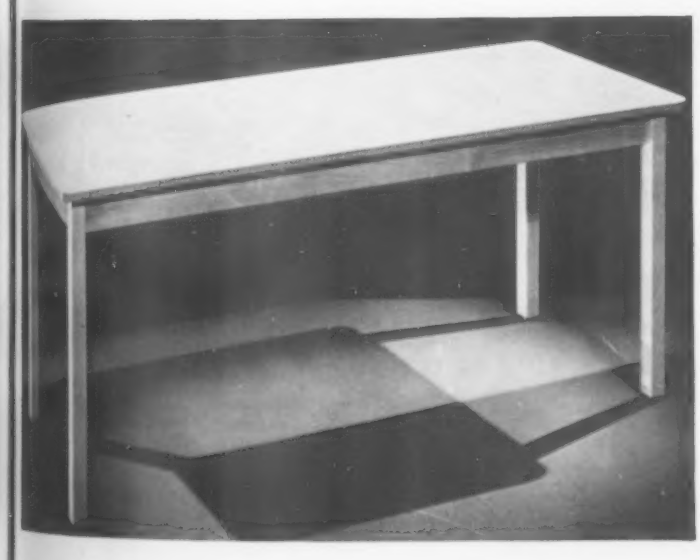
A circular work and study table, equally well adapted for use in kindergartens, libraries, classrooms and seminar rooms. Fully rounded, compartmented bookshelf which also serves as table base, is rigidly connected to the table top, allows for stacking, storage and simple, quick assembly. Natcolite laminated plastic school top. In Honey Maple and Silver Maple finish. Six standard top sizes from 30-inch to 60-inch diameter. Heights: 20, 23, 26, 29-inches.



NATIONAL STUDY TABLE

No. 2310

Long a favorite with educators, this table serves with equal distinction as a conference table, library table and as a project or general work table. There are no corner legs or parts to interfere with comfortable seating on all sides. Natcolite laminated plastic school top. Produced either with or without bookshelves, on one or both sides. Honey Maple or Silver Maple finish. Four standard top sizes. Heights: 20, 23, 26, 29-inches.



NATIONAL UTILITY TABLE

No. 2300

This table is suitable for any type of school use — in libraries, offices, cafeterias and classrooms, wherever functional considerations do not call for more specialized equipment. Exceptionally sturdy, this type of table has proven its claim to satisfactory service in more than 25 years of hardest use in cafeterias, hotels, restaurants and institutions. Natcolite laminated plastic school top. Choice of Honey Maple or Silver Maple finish. In 10 sizes from 24 x 24 to 36 x 96 inches. Heights: 20, 23, 26, 29-inches.

NATCOLITE REPLACEMENT DESK TOP





Surfaced With NEVAMAR *High-Pressure Laminates*

Here is the complete solution to the age-old maintenance problem of school desks and tables. Simply remove the old wooden tops and replace them with new NATCOLITE tops. They are surfaced with tough, non-porous, wear-resistant NEVAMAR high-pressure laminates that are highly resistant to stains, scars and scratches. NATIONAL offers these replacement tops at such a low price that a full replacement program proves more economical than resurfacing old, battered wooden tops. It can be accomplished without any interruption of regular schedules.

LOW LIGHT REFLECTANCE — Specially developed NEVAMAR laminates assure uniformly low light reflectance, no matter where these tops are used and regardless of the lighting arrangements.

SANITARY ASPECTS — The NATCOLITE top is completely sealed with the Wynene plastic edge, making it a germ-proof, sanitary working surface.

BEAUTY — The NATCOLITE top is made in beautifully grained silver maple or honey maple. Both finishes blend readily with any surroundings.

LOW MAINTENANCE — The NATCOLITE top reduces maintenance costs to a negligible minimum. It can be kept spotless by a swish of a damp cloth. Occasional washing with soap and water removes every trace of ink, paint and crayon. No polishing is ever necessary.

A NATCOLITE top never needs refinishing or resurfacing! It is designed for a lifetime of service and satisfaction.

NATIONAL SCHOOL FURNITURE COMPANY • **ODENTON, MARYLAND**

Division of National Store Fixture Co., Inc.

DC 4

Modern School Furniture with..... VIRCOLITE

PLASTIC TOPS OF QUALITY



VIRCO CHAIR DESKS
#300 SERIES
FEATURING VIRCOLITE PLASTIC TOPS

Won't tip over frontward—full frame support prevents tipping. Moderately priced with Vircolite Top at no additional cost, it has all the features of a more expensive unit. Available in 13", 15" and 17" size.



#110 CHAIR DESK

Real comfort and proper posture, with ample work surface—17" x 25"—and steel bookrack welded to frame. Available with VIRCOLITE *Lifetime Plastic desk top. Seat height—17" Desk height—26¼"*



#724 OPEN FRONT DESK

Firm and solid, yet lightweight for easy handling even by children. Made of heavy sheet steel, with tubular steel legs. Top of lacquered Eastern Maple or VIRCOLITE *Lifetime Plastic. Heights from 20" to 30" in 1" increments.*

also available in
#729—LIFT LID

Built Extra Strong

Combines beauty, function, durability and ease of handling.
No sharp corners or edges.
Free from all snagging or tearing hazards.
Easy to maintain—no costly upkeep.
Rigidly constructed of heavy gauge tubular steel and VIRCOLITE Lifetime Plastic Tops, also available in solid Eastern Maple.
Withstands years of rough wear and tear.

MFG. CORPORATION

"Makers of America's finest school desks, chairs and tables"

VIRCO CLASSROOM SIDE CHAIRS



#100 SERIES

#100 Series in 8 graded sizes from 11" to 18"—1-inch increment. Made of tubular steel and solid maple, resists wear, warping, scratching, staining and temperature changes.



#1000 SERIES

#1000 Series in 8 graded sizes Made of tubular steel, with plywood seat, solid maple back.



TABLET ARM CHAIRS

#108— Writing comfort without vibration. All tubular steel base with crescent bracing provides maximum rigidity. Chair height: 18" Tablet arm size: 12 x 24"
VIRCOLITE *Plastic Top also available*
Available also in #137 with steel book shelf in place of crescent bracing.

"MAKERS OF AMERICA'S FINEST SCHOOL DESKS, CHAIRS AND TABLES"

VIRCO CLASSROOM TABLES

WITH EXCLUSIVE "MICROMETER ADJUSTMENT"

in 3 graded heights



#460 ONE PUPIL TABLE

#400 SERIES

Each leg can be adjusted individually within a three-inch range. The importance of this cannot be overstressed, especially in schools built with slab floors. A simple turn of the "micrometer adjustment" compensates for unevenness of floors. All models available with adjustment mechanism if desired.

These tables are superior in every respect. Construction is exceptionally heavy-duty. Legs are of 2" steel tubing, working surface of solid Eastern Maple. VIRCOLITE *Plastic Top also available — highly resistant to marring, scratching or staining.*



#464 TWO PUPIL TABLE



#468 HALF-ROUND TWO PUPIL TABLE



#470 CLASSROOM TABLE
Book Compartment Optional



#600 SERIES

Top can be raised or lowered to any one of ten different heights, locking firmly in place. Rigid "Girder Construction" welded throughout. Will not vibrate in use. Full telescope supporting end sections and legs of heavy gauge cold rolled steel. Legs capped with rubber-cushion, noiseless steel glides. Tops available in Eastern Maple or VIRCOLITE *plastic sheet.*

TABLES

VIRCO

CAN'T TIP — SAFETY TESTED FOLDING CHAIRS

in 3 seat styles



#127 ALL STEEL

One-piece form fitted steel seat. Edges curled for added rigidity and smoothness.



#129 PLYWOOD SEAT

Contoured seat of hardwood plywood riveted to tubular steel frame. Finished in stain-resistant, chip-resistant high quality lacquer.



#130 PADDED SEAT

Upholstered seat of Vinyl plastic, well-padded. Wide color selection.

VIRCO + 5

EXCLUSIVE FEATURES

1. ***EXTRA*** **solid steel rod — NOT RIVETS — on which seat pivots between front legs.**
2. ***EXTRA*** **tubular reinforcing brace underneath front of seat.**
3. ***EXTRA*** **solid steel reinforcing plates on both sides of seat.**
4. ***EXTRA*** **steel tubular reinforcement inside front legs at seat pivoting point.**
5. ***EXTRA*** **steel brace between rear legs — TWO BRACES INSTEAD OF ONE.**



VIRCO FOLDING LEG BANQUET TABLES

Built **EXTRA STRONG,** *their advanced design reduces weight to a practical minimum without sacrificing strength and durability. Channeled girder-type steel underframe assures greater reinforcement. Choice of tempered Masonite; fir plywood in natural blonde finish, or* VIRCOLITE *Plastic in tan linen pattern.*

Write for complete free catalog. Please send us your specifications and bid forms.

VIRCO

MFG. CORPORATION

15134 SO. VERMONT AVE., LOS ANGELES, CALIF.

MAILING ADDRESS — P. O. BOX 44846, STATION H, LOS ANGELES 44, CALIF.

EASTERN OFFICE — 11 W. 42ND ST., NEW YORK 36, N. Y.

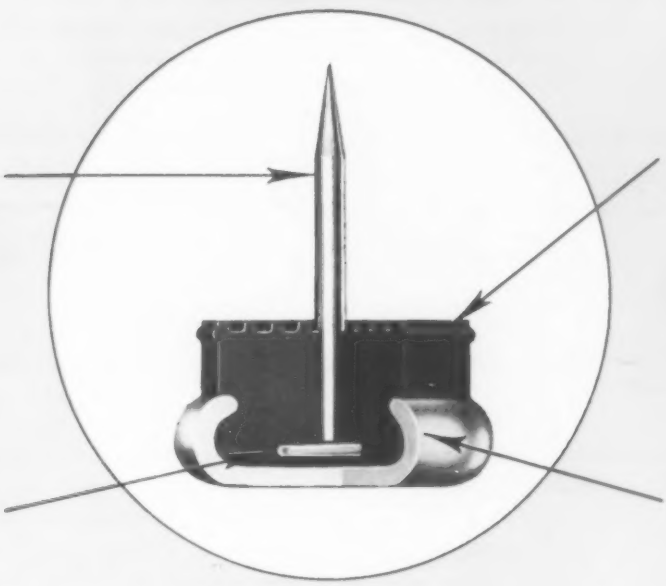
Bassick

GLIDES AND CASTERS FOR SCHOOLS

FOR

QUIETNESS
EASY ACTION
FLOOR PROTECTION

Every piece of School furniture needs RUBBER CUSHION GLIDES



CATALOG NO. ASU-53

Bassick "BASGO" RUBBER CUSHION GLIDES

NAIL TYPE FOR WOOD



Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness. NO METAL TO METAL CONTACT BETWEEN BASE AND NAIL WHEN APPLIED.

Recommended for use on chairs, tables and other pieces of furniture where protection of floors, easy sliding and elimination of noise is desirable. Ideal for use on hard surface floors (tile, concrete, terazzo, wood etc.) and all composition floor coverings.

The sharp nail drives easily. When being applied to small legs or in hard wood, a slight lead hole will facilitate the installation.

SPECIFICATIONS

Base Diam.	Catalog Numbers		Size recommendation — use the size with the largest diam. base the leg will accommodate, for greatest floor protection especially on linoleum, asphalt tile or other resilient floor coverings.	Unit Packing		Carton Packing	
	Nickel Finish	Stainless Steel		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
7/8"	CG-90	CG-90SS		6	3/4 lb.	180	20 lbs.
1 1/16"	CG-91	CG-91SS		6	1 lb.	108	20 lbs.
1 1/4"	CG-92	—		6	1 lb.	72	15 lbs.
1 1/2"	CG-93	—		3	7/8 lb.	36	15 lbs.

SOCKET TYPE FOR WOOD



These glides are for use where chairs and other furniture have already been equipped with gripneck caster sockets. It is an easy matter to remove the caster and insert these quiet, easy sliding rubber cushion glides.

Constructed with a heavier gauge flat steel base having a greater degree of hardness than competitive glides, providing longer life and easier sliding qualities. A live rubber cushion affords complete cushioning and maximum quietness.

SPECIFICATIONS

Base Diam.	Catalog Numbers	Socket Data			Standard Finish	Unit Packing		Carton Packing	
		Bore Diam.	Bore Depth	Standard Socket		Sets Per Box	Weight Per Box	Boxed Sets	Gross Weight
1 1/4"	CG-392	3/8"	1 1/2"	No. 3 1" Track Plate	Nickel	1	7 oz	25	12 lbs.
1 1/2"	CG-393	3/8"	1 1/2"			1	9 oz.	25	15 lbs.

MACHINE SCREW TYPE FOR METAL



SAME CONSTRUCTION AS NAIL TYPE SHOWN ABOVE EXCEPT WITH 8-32 MACHINE SCREW STEM PROJECTING 3/8" ABOVE RUBBER CUSHION.

FURNISHED STANDARD WITH NUT AND LOCK WASHER. WHERE THESE ARE NOT REQUIRED OMIT SUFFIX DESIGNATION X23 FROM CATALOG NO.

SPECIFICATIONS

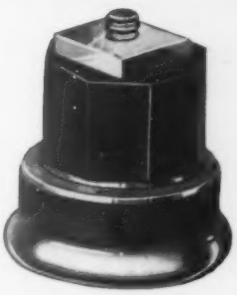
Base Diam.	Catalog Numbers	Stem Data	Standard Finish	Standard Packing
7/8"	CG-290X23	8-32 Machine Screw With 3/8" Projection, Nut and Lock Washer	Nickel	Bulk
1 1/16"	CG-291X23			
1 1/4"	CG-292X23			
1 1/2"	CG-293X23			

FOR METAL TUBING WITH RUBBER EXPANDING ADAPTERS

The rubber expanding adapters are pliable enough to fit commercial variations of inside tubing diameters and are available in sizes to fit practically all of the popular sizes of tubing used on metal furniture. They provide a secure, simple, practical method of easy application. The tight fit of the rubber expander is an added noise and vibration reducer. They will not work loose under any normal operating conditions.

The adapter is expanded by turning the base of the glide by hand forcing the rubber adapter to bulge and fill the tubing, giving full length contact. The adapter can take all side shocks with no danger of bending or loosening.

Recommended for tables, stands, chairs and all metal furniture with tubular legs meeting the floor in a vertical position.

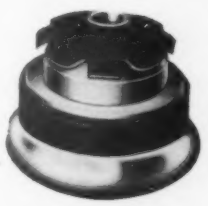




SPECIFICATIONS

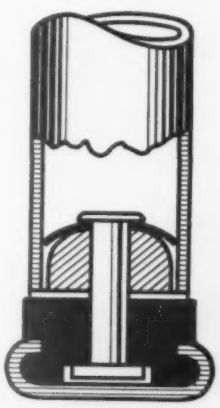
Base Diam.	Catalog Numbers	For Outside Tubing Diameter		For Inside Tubing Diameter		Size Recommendation	Standard Finish	Weight Per Set	Standard Packing
		Nominal	Gauge	Nominal	Exact				
⅞"	CG-890 ⅝"	⅝"	18	17/32"	.527"	Check Inside Diameter of Tubing to Determine Correct Glide for Application.	Nickel	3 oz.	Bulk
	CG-890 ¾"	¾"	18	21/32"	.652"			3 oz.	
	CG-890 ⅞"	⅞"	18	25/32"	.777"			3 oz.	
1 1/16"	CG-891 1"	1"	16	29/32"	.902"			4 oz.	
	CG-891 1 1/16"	1 1/16"	18	31/32"	.964"			4 oz.	
1¼"	CG-892 1¼"	1¼"	16	1⅜"	1.120"			6 oz.	

"UMBRELLA" TYPE FOR METAL TUBING



These glides are specially designed for institutional and school use on metal chairs and cannot be removed except with tools. The umbrella-shaped steel spring retainer surmounts a dome shaped spacer bushing. Any attempt at removal, except with mechanic's tools, causes the umbrella-shaped retainer spring to bite deeper into the metal of the chair leg.

The design of Bassick rubber cushion glides prevents metal to metal contact between equipment leg and slide base thus eliminating noise and chatter when equipment is moved. SEE APPLICATION CUT-AWAY AT RIGHT.



SPECIFICATIONS

Base Diam.	Catalog Numbers	For Tubing		Standard Finish	Weight Per Set	Standard Packing
		Outside Diam.	Inside Diam.			
⅞"	CG-590 ¾"	¾"	⅝"	Nickel	3¼ oz.	Bulk
1 1/16"	CG-591 1" XLM	1"	.870"		5½ oz.	

*This size supplied standard with leg mount.

BASSICK CASTERS

The Bassick Company is the largest manufacturer of casters in the world. The items listed on this page are representative types often used in schools. Complete catalog data and recommendations for any specific installation will be gladly furnished on request.

CASTERS FOR SCHOOL PIANOS

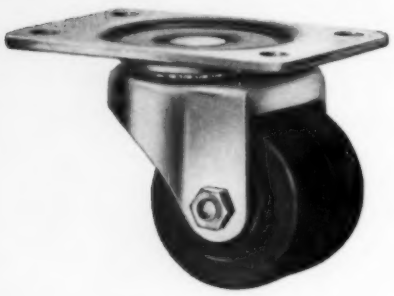


PLATE AND SOCKET TYPES—DOUBLE WHEEL

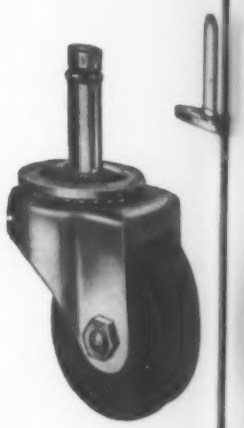
Low overall height, full floating ball bearing Diamond-Arrow casters specifically designed for easy movement of pianos in schools and protection to floors.

SPECIFICATIONS

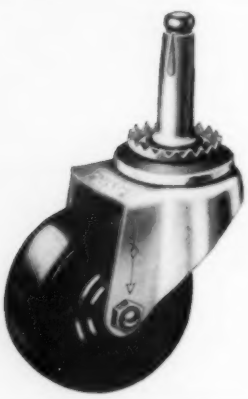
Wheel Diam.	Tread Width	Overall Height Stem Caster	Overall Height Plate Caster	Size of Top Plate	Bolt Hole Spacing	Size of Bolt Holes
2"	1 5/8"	2 5/8"	2 13/16"	2 3/4 x 3 3/4"	1 3/4 x 3"	11/32"

CATALOG NUMBERS

Wheel Diam.	Catalog Numbers	Type Caster	Type Wheel	Weight Per Set-lbs.
2"	9006x2-66	Stem	Baco	3 1/2
2"	9006	Plate	Baco	4



CASTERS FOR CHAIRS



DIAMOND-ARROW

The largest selling quality office chair caster — because of economy combined with top quality. The patented two level full floating ball race construction provides maximum ease of swiveling. Wheels have self-lubricating bearings.

The "Baco" soft rubber tread wheel is recommended for school use.

Catalog Numbers	Wheel Diam.	Tread Width	Overall Height	Bore for Socket	Weight Per Set
7696	1 5/8"	3/4"	2 1/8"	3/8"	21 oz.
9696	2"	13/16"	2 1/2"	3/8"	25 oz.

The casters listed are for wood chairs or furniture but can also be supplied with stems for all types of metal chairs.

CASTERS FOR DOLLIES AND TRUCKS



SERIES "68" "DIAMOND-ARROW"

The swivel truck casters listed below have the patented two level full-floating ball bearing construction which provides the utmost in easy action combined with economy. The numbers listed are supplied with the "Baco" soft rubber tread floor protecting wheels, self-lubricating bearings, and thread guards.

These are ideal for chair trucks and miscellaneous school service trucks. The Bassick Company manufactures various sizes and types of truck casters for every purpose. Complete catalog and information will be furnished on request.

SPECIFICATIONS

Wheel Diam.	Load Cap. Each	Catalog Numbers	Tread Width	Overall Height	Plate Size	Bolt Hole Spacing
2 1/2"	80	2686-1	1 1/8"	3 5/16"	2 3/4" x 3 3/4"	1 3/4" x 3"
3"	100	3686-1	1 5/16"	3 13/16"	2 3/4" x 3 3/4"	1 3/4" x 3"
4"	125	4686-1	1 5/16"	5 1/16"	3 1/8" x 4 1/8"	2 3/8" x 3 7/8"
5"	125	5686-1	1 5/16"	6 1/16"	3 1/8" x 4 1/8"	2 3/8" x 3 7/8"



*Reg. U. S. Pat. Off.



The G-E Textolite Sage pattern is designed expressly for the schoolroom.

LAMINATED AND INSULATING PRODUCTS DEPARTMENT

CHEMICAL DIVISION

GENERAL ELECTRIC

COSHOCTON, OHIO

Save on maintenance and cleaning costs and keep eyestrain to a minimum with G-E TEXTOLITE plastics surfacing.

Many school boards throughout the country are recommending G-E Textolite plastics surfacing—both for completely new installations and for classrooms that are being remodeled. G-E Textolite topped desks offer you so many big advantages:



GOOD LOOKS

Select the distinctively styled Sage or Birch patterns for modern schoolrooms with the accent on style. A new satin finish helps reduce eyestrain, too.



RUGGED DURABILITY

G-E Textolite resists stains, scratches, and hard knocks. Spilled inks, ordinary household chemicals, and heat have no effect on its surface under normal usage.



PROPER LIGHT REFLECTANCE

Sage and Birch colors conform wi "American Standard Practice for Scho Lighting" and meet the approval o G.E.'s Nela Park lighting engineers.



EASY MAINTENANCE

G-E Textolite cleans easily with a damp cloth and requires no annual painting or refinishing—cleaning time and labor are cut in half.



GREAT UTILITY

Pupils and teachers appreciate the clean, neat work surface. School work is turned out faster, better and with more enthusiasm than ever before.

A DEPENDABLE NAME

You can be proud to mention th General Electric product as an indi tion of the high standards you set f classroom installations.





SCHOOL DESKS

TABLES

WORK SURFACES

There are so many places you can use G-E Textolite plastics surfacing in your schools. Consider it for these purposes:

SINK AND COUNTER TOPS

WASHROOMS





G-E TEXTOLITE *patterns are recommended for school desk tops based on light reflectance tests made by Nela Park lighting engineers.*

TX1905 Green Sage, % of reflectance—41.5

TX9401 Birch, % of reflectance—45.7

Below is a reproduction of the Green Sage pattern (TX1905).



The "pressed-in" satin finish eases eyestrain; and the pleasing colors reduce contrast between desk tops and the work material, and conform with "American Standard Practice for School Lighting."

For more information and actual samples of G-E Textolite, get in touch with your nearest G-E Textolite distributor or write General Electric Company, Chemical Division, Coshocton, Ohio.

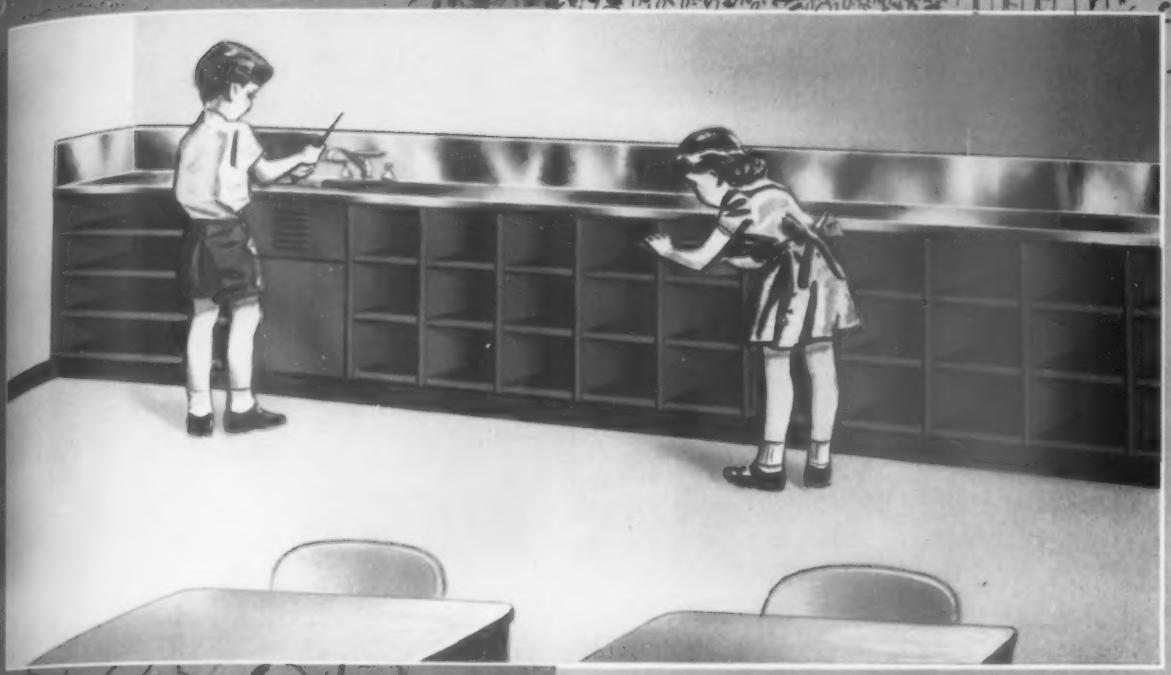
AUTHORIZED DISTRIBUTORS

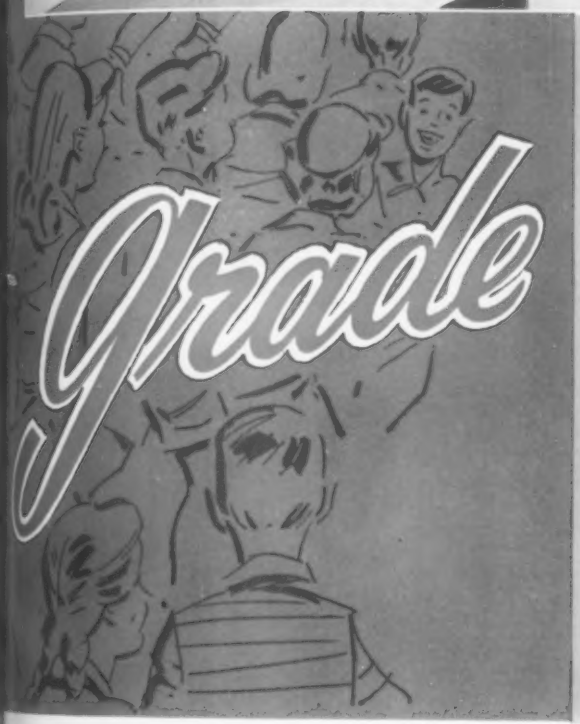
Alabama: Birmingham Sash & Door Co., 901 28th St., N. Birmingham; Tulane Hardwood Lumber Co., 411 Virginia St., Mobile • **California:** W. L. Dixon Co., 931 E. 31st St., Los Angeles 11; Roddis California, Inc., 2620 E. Vernon Ave., Los Angeles 58; Roddiscraft, Inc., 345 Williams Ave., San Francisco 24; Roddiscraft, Inc., 720 Williams St., San Leandro • **Colorado:** Carpenter Paper Co., 1504 23rd St., Denver 17 • **Florida:** Atlanta Oak Flooring Co., 3511 Walnut St., Jacksonville; Rankin-Fisher, Inc., 56 N. Gertrude St., Orlando; Roddis Company, 315 N.E. 73rd St., Miami 38 • **Georgia:** Atlanta Oak Flooring Co., 920 Glenwood Ave., S.E., Atlanta; Wm. M. Bird & Co., Inc., 604 Reynolds St., Augusta • **Hawaii:** American Factors Ltd., P.O. Box 3230, Honolulu 1 • **Illinois:** Roddis Company, 3865 W. 41st St., Chicago 32 • **Indiana:** Irby S. Defenelon Company, 920 E. New York St., Indianapolis • **Iowa:** Des Moines Bldg. Supply, 300 S.W. 9th St., Des Moines 9; Tip-Top Distributing Company, 300 Southwest 9th St., Des Moines 9 • **Kansas:** Roddis Lumber & Veneer Co., Inc., 35 Southwest Blvd., Kansas City 3 • **Kentucky:** Roddis Panel & Door Co., 1201 So. 15th St., Louisville 10 • **Louisiana:** Tulane Hardwood Lumber Co., Chocktaw Rd., Baton Rouge; Tulane Hardwood Lumber Co., Inc., 4200 Tulane Ave., New Orleans 19 • **Maryland:** Eastern Woodworks, Inc., 1300 Bayard St., Baltimore 30; Eisinger's Builders Supply, 7327 Wisconsin Ave., Bethesda • **Massachusetts:** Roddis Plywood & Door Co., Inc., 229 Vassar Street, Cambridge 39 • **Michigan:** Roddis Lumber & Veneer Co. of Michigan, 11855 E. Jefferson Ave., Detroit 14 • **Minnesota:** Lasher Carpet & Linoleum Co., 524 Fifth Street, N. Minneapolis • **Missouri:** Roddis Company, 3344 Morganford Rd., St. Louis 16 • **Nebraska:** The Brinn-Jensen Company, 1110 Harney St., Omaha • **New Jersey:** Roddis Co., Inc., 103 Marsh St., Port Newark • **New York:** Plywood Fabricators, 832 Filmore Ave., Buffalo 12; Roddis Company, 1756 Plaza Ave., New Hyde Park, Long Island; Roddis Plywood & Door Co., Inc., 920 East 149th St., New York 55; Saltpoint Supply Corp., 539 Hiawatha Blvd., Syracuse 8 • **North Carolina:** Atlanta Oak Flooring Co., 2121 Thrift Rd., Charlotte; Roddis Panel & Door Co., 123 E. 27th St., Charlotte 6 • **Ohio:** Roddis Panel & Door Co., 836 Depot St., Cincinnati 4; Roddis Panel & Door Co., 2717 E. 75th St., Cleveland 4; Wycoff Sales Company, 204 E. Mound St., Columbus 15 • **Oklahoma:** Caston Lumber Co., 4412 N. Western Ave., Oklahoma City • **Oregon:** C. A. Newell Company, 71 S.E. Oak St., Portland • **Pennsylvania:** Morris Paper Co., 6th & Broad Sts., Johnstown; Morris Paper Co., 21st Street, Pittsburgh 22; Roddis Co., Inc., Cor. Richmond & Tioga Sts., Philadelphia 34 • **South Carolina:** Wm. M. Bird & Co., Inc., 244 E. Bay Street, Charleston; Wm. M. Bird & Co., Inc., Box 1324, Columbia • **Tennessee:** Atlanta Oak Flooring Co., 801 Bluff St., Chattanooga; Tennessee Metal Molding Co., 828A 8th Avenue, S., Nashville; Welsh Plywood Corp., 207 Scott St., Memphis 12 • **Texas:** Macatee, Inc., 4703 Bengal St., Dallas; William Cameron & Co., Whsle., 1901 Cullen Blvd., Houston; George C. Vaughan & Sons, 628 Buena Vista St., San Antonio 7; Wm. Cameron Co. (Whsle.), 24th & Mary Sts., Waco • **Utah:** Western Equipment Co., 928 S. Main St., Salt Lake City • **Virginia** Williams & **Reed,** Inc., 283 Court St., Norfolk; Williams & Reed, Inc., 1401 E. Franklin St., Richmond • **Washington:** C. A. Newell Co., 933 Westlake Ave., N., Seattle 9 • **West Virginia:** Plastics Sales Co., 1116 Central Ave., Charleston • **Wisconsin:** Roddis Plywood Corp., Marshfield; Roddis Plywood Corp., 4601 W. State St., Milwaukee 8.

GENERAL ELECTRIC

CDL-113A (2-54—18.5M)







Grade Aid

CUBBIES

ALL STEEL
COMBINATION
SINK AND COUNTERS

R PRIMARY AND GRAMMAR SCHOOLS

COLONIAL ENGINEERING COMPANY
INCORPORATED
48 Grove Street · Somerville 44, Mass.

GRADE-AID steel counter cabinets

The trend of modern education methods has been requiring more and more classroom project work, art and other manual activities in the elementary grades of the modern school system. This has brought about a need for more storage space for the individual student's materials and general classroom supplies, as well as more available work space.

• GRADE-AID steel combination counter cabinets

have been designed by Colonial to fulfill virtually all conceivable needs that might arise in the modern elementary classrooms of today. GRADE-AID provides: work space on the counter top; shelf units for the storage of materials and supplies; cubicle units for the children's individual storage use, and a sink unit for a readily accessible water supply for classroom work and washing facilities

special features

• ideal space saver

The GRADE-AID combines many uses into one compact unit, thus allotting the area saved to other activities such as exercising, dancing, naps, etc.

• heavy-duty steel construction

makes GRADE-AID a strong, durable, fireproof installation and eliminates the carving and defacing problem which is usually encountered when cabinets can be cut. The stainless steel counter tops and storage cabinets below, finished in baked-on enamel are practically indestructible as well as neat and modern in appearance.

• flexibility of design

The three types of under-cabinets can be combined as desired, and the top and base made to fit the desired arrangement. This also applies to the position of the sink.

• keeps children and room clean

Paints, paste, crayons and stains are kept from walls, floors, and desks when the children work on GRADE-AID. Sink unit provides ready access to water supply which facilitates project work, water-coloring, etc. Also helps children to wash up quickly under the teacher's supervision.

• easily kept clean

The stainless steel top and the enamel finish on the cabinets are easily kept clean with a damp cloth. Children enjoy taking part in cleaning up when it is easy to do so. Also, the splashback protects the wall from mess or water damage.

• choice of colors

Perfect harmony with modern décor is assured with a GRADE-AID installation. The stainless steel counter top harmonizes with any color scheme. The baked-on enamel finish of the under-cabinets is available in 3 standard colors of medium gray, jade green, and beige. Special matching colors are available on request.

• safety-engineered

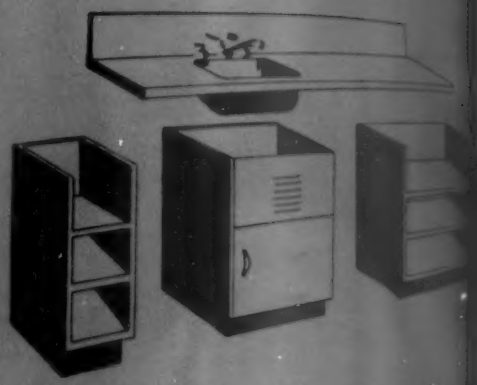
All of the exposed metal edges and corners on the GRADE-AID stainless steel tops have been carefully rounded, assuring absolute protection to the children.

• simply installed

GRADE-AID cabinets are joined together without the use of screws or bolts. The interlocking cabinets snap into the base and the counter top clamps onto the cabinet top flanges, thus securing the combination as one unit. The base cabinets are screwed to the walls through hole in back of cabinet if required. The installation can also be moved if necessary, without damage to the parts.

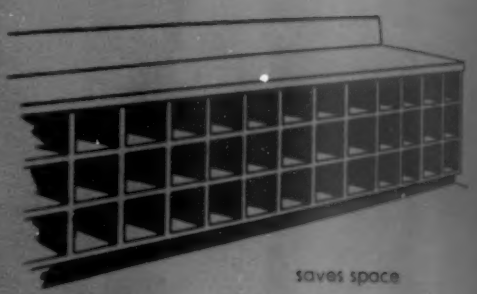
• alternate counter tops

of linoleum, Formica, etc. are available if desired. We recommend the one-piece stainless steel top as it has no extra mouldings and is easier to keep clean.



standard units

GRADE-AID cabinet units come in standard sizes for [illegible] in kindergarten, and 1st to 5th grades. For sizes see the [illegible] on the following page.



saves space



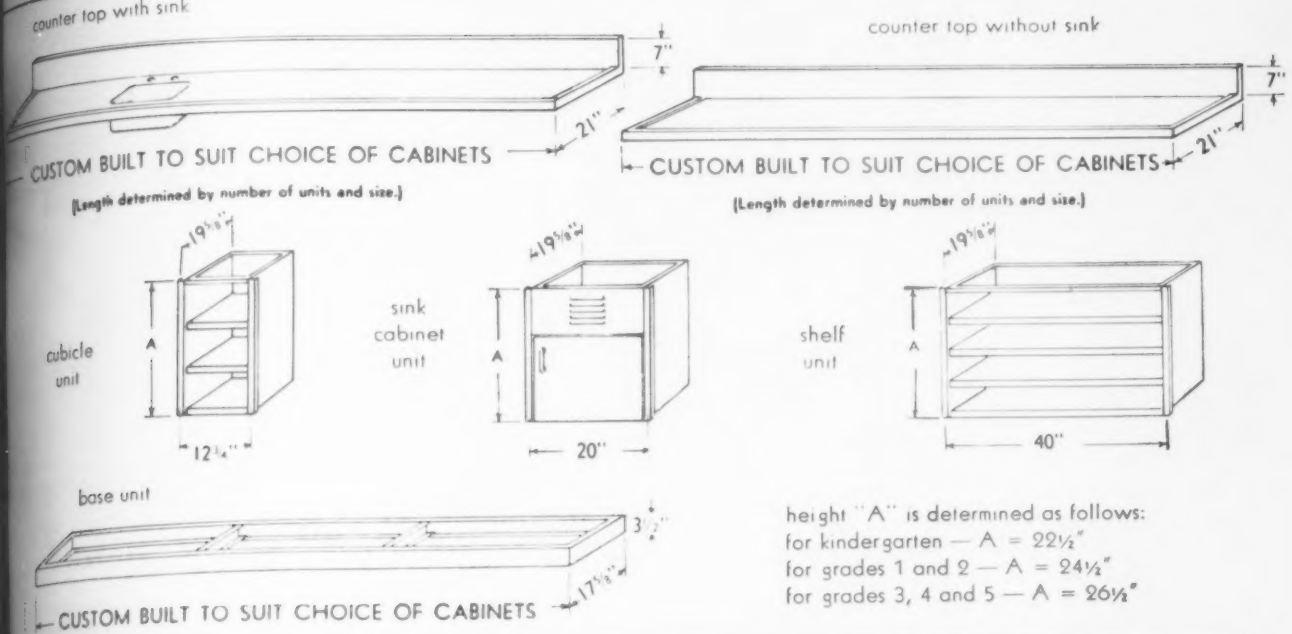
keeps supplies off desks [illegible]

architects and educators endorse GRADE-AID

Dr. D. A. Newman, Superintendent of Schools, [illegible] Mass., says, "The GRADE-AID saves valuable working [illegible] and helps keep the rooms neat and clean. All my teachers [illegible] very favorably impressed with GRADE-AID."

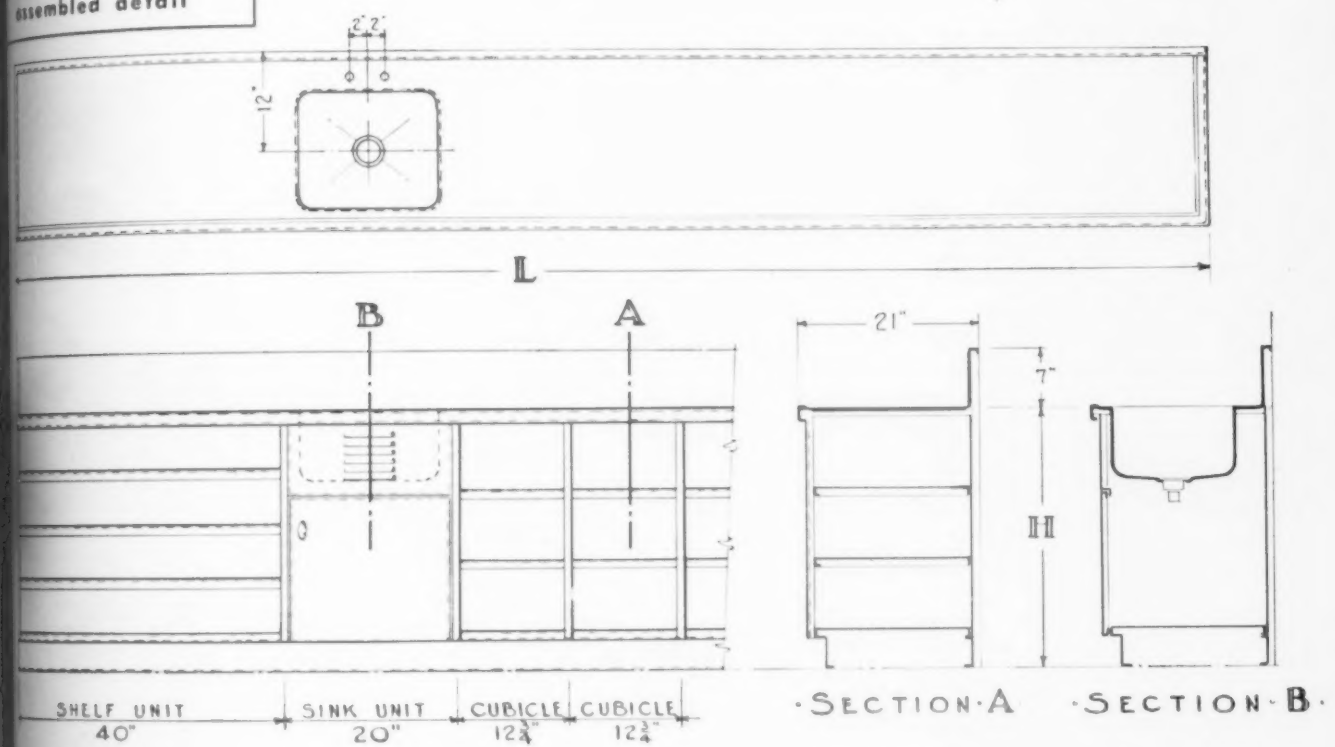
steel storage and work counters for schools

components



height "A" is determined as follows:
for kindergarten — A = 22½"
for grades 1 and 2 — A = 24½"
for grades 3, 4 and 5 — A = 26½"

assembled detail



Under-cabinet steel — #20 gauge cold-rolled steel.

Under-cabinet colors — three standard colors: medium gray, jade green and beige. Matching colors available on request.

Stainless steel counter tops — #16 gauge stainless steel with #4 finish, custom-built to suit choice of under-cabinets.

Stainless steel sink — 1 piece, deep-drawn, stainless steel — furnished with faucet. All vertical and horizontal corners fully rounded with intersection of corners spherically coved. Sinks are seamlessly welded to counter tops and stainless steel strainer-type waste is supplied with sinks.
Traps and connections to be supplied by others.

Note: The GRADE-AID may be obtained in any length or combination of lengths of standard units of 40", 20" and 12¾". For example, the 20"-sink unit may be used in conjunction with 5 tiers of cubicles of 12¾" each and 2, 40"-storage areas, all depending on your individual needs and specifications. Special shelf cabinets, if required for use around outside room counters, can be furnished on request. Length L determined by number and type of cabinets desired. Exposed ends of under-cabinets require end panels.
Height H varies with the individual location.

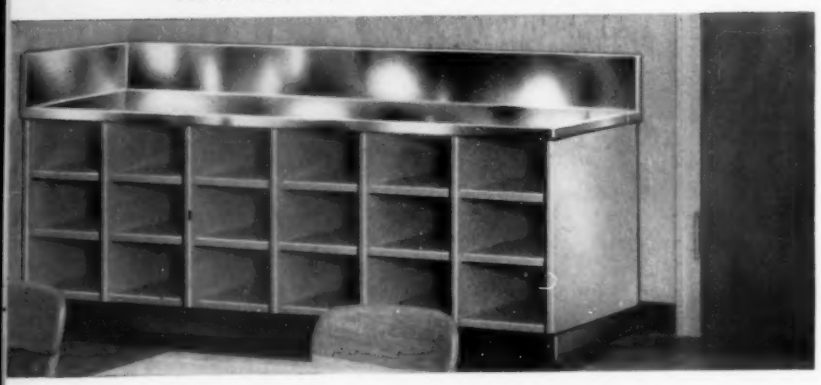
These working heights are recommended: 26" for kindergarten; 28" for 1st and 2nd grades, 30" for 3rd, 4th and 5th grades.

Colonial Engineering Company, Inc.

typical combinations



counter cabinet with sink and shelf cabinet combination



corner installation of counter cabinet with cubicle units



counter cabinet with sink and cubicle units combined

specifications

Supply and install steel combination work counters, sinks and storage cabinets as made by Colonial Engineering Co., Inc. of W. Somerville, Mass., where indicated on plans or details in the following rooms.

Work counter and storage cabinet combinations shall consist of standard size steel under-cabinet units for assembly with one-piece custom-built stainless steel tops and one-piece [illegible] bases. Working heights: 26" high for kindergarten; 28" high for 1st and 2nd grades, and 30" high for 3rd, 4th, and [illegible] grades. All units 19⅝" deep.

Stainless steel tops — shall be custom-made in one piece to suit number and types of under-cabinet units as selected and shall be made of #16 U.S.S. gauge stainless steel, die-formed and welded into one piece, and shall be designed to close onto cabinet top flanges. Heavy steel backing shall be cemented to underside of all flat surfaces for stiffening and deadening.

Splashback 7" high integral with top shall be furnished for backs and ends adjoining walls. All edges shall be die-formed into channel shape. Top shall be die-depressed to form a [illegible] raised edge along working side, with corners rounded and welded. The entire top shall be polished to a #4 mill finish without waves or streaks.

Under-cabinets — shall be of special interlocking design of #20 U.S.S. gauge cold-rolled furniture steel, die-formed; back of cabinets must have screwhole for fastening to wall if required, and end panels are to be supplied for closing off exposed ends of counter.

Shelf units — 40" wide with 4 shelves; cubicle storage units 12¾" wide with 3 shelves; sink cabinet units 20" wide with 1 shelf, double-walled door with welded corners and with rubber bumper type latch; number of units of each type to be supplied and arranged as shown on drawings.

Finish — All steel shall be cleaned and finished with [illegible] of baked-on enamel in one of 3 standard colors.

Sink — Where required over sink unit, supply a one-piece deep-drawn, stainless steel sink having all vertical and horizontal corners fully rounded and intersections of corners spherically coved. Joint between sink and top shall be seamlessly welded by "Heliarc" Process. All welded seams, corners, etc., shall be ground, sanded and polished to a #4 mill finish.

Fixtures — Sinks shall be equipped with combination faucet and stainless steel strainer-type waste. Traps and other fittings to be supplied by others.

Steel base — shall be made in one unit so designed to allow the bottom of cabinet units to snap into base without the use of bolts or other fasteners. Face of base to be set back for toe [illegible]

representatives

Alabama School Supply Co.
Montgomery, Alabama

All-State Supply, Inc.
Little Rock, Arkansas

Austin-Bentley Seating Co.
Los Angeles 19, California

Bayley's Lab. & Sch. Equip. Agcy.
Tampa, Florida

Brosk Office Supply Company
Kenosha, Wisconsin

Buffalo School Equipment Co.
Buffalo, New York

Burns Institutional Sales Co.
Indianapolis 8, Indiana

F. G. Burton Company
Salt Lake City 10, Utah

The Fred M. Cole Corp.
Cincinnati 10, Ohio

Crichton Engineering Co., Inc.
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G. E. Henry Company
Columbus 15, Ohio

Hicks-Ashby Company
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E. Norton Hill, Inc.
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W. C. Hixson Company
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Martin School Equipment Co.
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Northern School Supply Co.
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Oglesby Equipment Company
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Potomac Engineering Corp.
Chicago 11, Illinois

Tennessee Equip. & Supply Co.
Nashville, Tennessee

Thatcher, Inc.
Topeka, Kansas

Universal Equipment Company
Raleigh, North Carolina

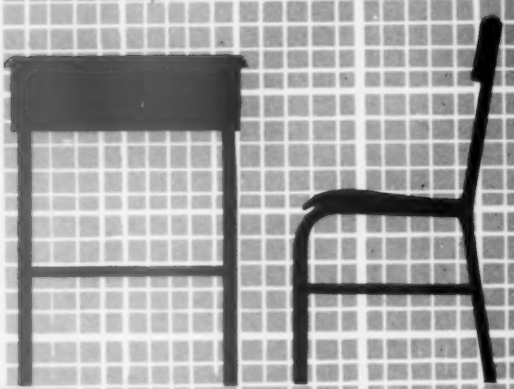
Virginia School Equipment Co.
Richmond 20, Virginia

C. G. Wall, Associates
Philadelphia, Pennsylvania

COLONIAL ENGINEERING COMPANY
INCORPORATED
48 Grove Street · Somerville 44, Mass.

ARCHITECTURAL BULLETIN NO. SF 454

WESTMORELAND



POSTURE-ENGINEERED

school furniture

DESIGNED IN

ALL SIZES...PROPORTION-SCALED

FOR ALL GRADES

FROM KINDERGARTEN

TO COLLEGE

WESTMORELAND METAL MANUFACTURING CORP.

WESTMORELAND

POSTURE-ENGINEERED *School furniture*



OVER THE YEARS, WESTMORELAND has earned an enviable reputation for *quality, reliability, integrity* and *service.* The two plants, illustrated here, are the homes of WESTMORELAND products. Equipped with the best available modern automatic equipment, it is here that WESTMORELAND trained craftsmen jealously guard that reputation.

In these factories we create and fabricate not only school furniture, but many other widely used WESTMORELAND products as well. Chief among these are tubular commercial and household furniture, and protective, decorative window and door grilles.



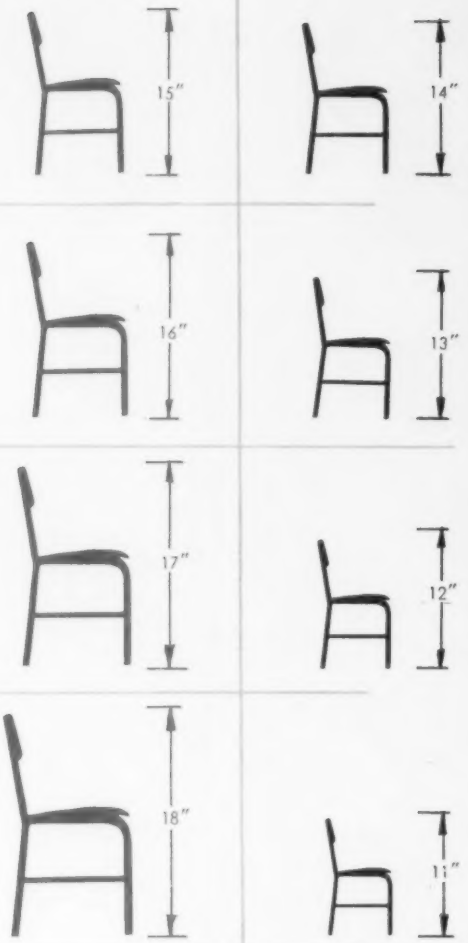
WESTMORELAND METAL MANUFACTURING CORP.

MILNOR AND BLEIGH STREETS • PHILADELPHIA, PA.

WESTMORELAND TUBULAR STEEL UTILITY CHAIR

NUMBER TC101 WESTMORELAND UTILITY CHAIR





Economical, yet durable, this functional all-purpose chair is ideal for classrooms, offices, cafeterias, and libraries. Comfortable because it is POSTURE-ENGINEERED, it is manufactured to conform with the requirements of the New York City Board of Education.

SPECIFICATIONS: No. TC101 Utility Chair

SEAT 5-ply hardwood. Contour-rolled seat front.

BACK RAIL 7-ply hardwood. Contour-bent under steam and pressure.

All plywood parts have birch veneered surfaces. Urea resin bonding under high heat and pressure assures no warping or separation of laminations.

FRAME 1″ x 18 gauge steel tubing. Crescent bracing welded to frame provides a rigid, durable one-piece unit.

GLIDES Rubber mounted, heavy nickel plated.

FINISH Wood surfaces are smooth-sanded and finished to a rich, lustrous honey-blond color. Metal surfaces are School Brown. All metal parts are Bonderized, then SPRAYED TWICE and INFRA-RED BAKED TWICE at 375° Fahrenheit to insure our guarantee against rust, peeling, flaking or discoloration. *Other wood and metal finishes to special order.*

Available in 8 *Proportion-Scaled* sizes:

Style No.	Height of seat	Width of seat	Depth of seat	Overall Width	Overall Depth	Overall Height	Back Rail
TC101/18	18″	16½″	15¾″	16½″	18⅝″	32″	6½″ x 15¾″
TC101/17	17″	16½″	15¾″	16½″	18½″	31″	6½″ x 15¾″
TC101/16	16″	16½″	15¾″	16½″	18⅜″	30″	6½″ x 15¾″
TC101/15	15″	14½″	13¾″	14½″	17″	28″	6″ x 14¼″
TC101/14	14″	14½″	13¾″	14½″	16⅞″	27″	6″ x 14¼″
TC101/13	13″	13½″	12½″	13½″	15″	25″	5¾″ x 13¼″
TC101/12	12″	13½″	12½″	13½″	14⅞″	24″	5½″ x 11¾″
TC101/11	11″	12″	11½″	12″	13½″	22″	5½″ x 11¾″

WESTMORELAND TUBULAR STEEL TABLE-DESK



WESTMORELAND Table-Desks are designed with both classroom requirements and student needs in mind. Maximum flexibility and efficiency . . . top economy . . . all are built-in WESTMORELAND qualities. In 8 ultra-durable *Proportion-Scaled* sizes, each table is manufactured in conformity with the rigid standards set by the New York City Board of Education.

SPECIFICATIONS: No. TD150 Table-Desk

TOP 7-ply hardwood. Birch veneered surfaces. 12½" pencil groove. Urea resin bonding under high heat and pressure assures no warping or separation of laminations.

SKIRT Heavy gauge pressed steel on 3 sides.

BOOK SHELF Heavy gauge steel.

FRAME 1" x 18 gauge tubular legs and bracing securely welded to skirt and book shelf to form rigid one-piece unit.

GLIDES Rubber mounted, heavy nickel-plated.

FINISH Wood surfaces are smooth-sanded and finished to a rich, lustrous honey-blond color. Metal surfaces are School Brown. All metal parts are Bonderized, then SPRAYED TWICE and INFRA-RED BAKED TWICE at 375° Fahrenheit to insure our guarantee against rust, peeling, flaking or discoloration. *Other wood and metal finishes to special order.*

TOP SIZE 18" x 24"

Style No.	Height	Style No.	Height
TD150/18	18"	**TD150/25**	25½"
TD150/20	20"	**TD150/27**	27"
TD150/22	22"	**TD150/28**	28"
TD150/24	24"	**TD150/29**	29"

SCHOLAR-LINE PRESSED STEEL TABLET-ARM CHAIR



Greater strength is only one of the advantages found in this SCHOLAR-LINE Tablet-arm chair, for it combines utility, and flexibility with contemporary eye appeal. Both the seat and back rails are POSTURE-ENGINEERED for maximum comfort.

SPECIFICATIONS: No. STA200/17 Tablet-arm Chair

TABLET ARM	7-ply hardwood. Heavy gauge steel support is securely bolted to chair frame and formed to provide maximum seating comfort.
SEAT	5-ply hardwood. Contour-rolled seat front.
BACK RAILS	7-ply hardwood. Contour-bent under steam and pressure.

All plywood parts have birch veneered surfaces. Urea resin bonding under high heat and pressure assures no warping or separation of laminations.

FRAME	Heavy gauge steel, electrically welded. Extra bracing at points of heaviest stress.
BOOK STORAGE	Steel bottom and 2 sides.
GLIDES	Rubber mounted, heavy nickel-plated.
FINISH	Wood surfaces are smooth-sanded and finished to a rich, lustrous honey-blond color. Metal surfaces are School Brown. All metal parts are Bonderized, then SPRAYED TWICE and INFRA-RED BAKED TWICE at 375°, Fahrenheit to insure our guarantee against rust, peeling, flaking or discoloration. *Other wood and metal finishes to special order.*
SEAT HEIGHT	Available with 17" seat height only.
ARM WIDTH	(Front) 11-3/16" (Rear) 4⅛"
ARM DEPTH	24¾"

SCHOLAR-LINE PRESSED STEEL UTILITY CHAIR

NUMBER 175 SCHOLAR-LINE UTILITY CHAIR





Here is an all-purpose school chair that is remarkably sturdy and outstandingly handsome. Perfect for either the "rough-treatment" area or the luxurious public room, the SCHOLAR-LINE Utility chair, like all WESTMORELAND chairs, is POSTURE-ENGINEERED for comfort.

SPECIFICATIONS: No. SU175 Utility Chair

SEAT 5-ply hardwood. Contour-rolled seat front.

BACK RAILS 7-ply hardwood. Contour-bent under steam and pressure.

All plywood parts have birch veneered surfaces. Urea resin bonding under high heat and pressure assures no warping or separation of laminations.

FRAME Heavy gauge steel, electrically welded. Extra bracing at points of heaviest stress. Heavy gauge steel brace and cross-pieces electrically welded to sides to form rigid, durable unit.

GLIDES Rubber mounted, heavy nickel-plated.

FINISH Wood surfaces are smooth-sanded and finished to a rich, lustrous honey-blond color. Metal surfaces are School Brown. All metal parts are Bonderized, then SPRAYED TWICE and INFRA-RED BAKED TWICE at 375° Fahrenheit to insure our guarantee against rust, peeling, flaking or discoloration. *Other wood and metal finishes to special order.*

In 4 *Proportion-Scaled* sizes:

Style No.	SU175/11	SU175/13	SU175/15	SU175/17
Seat Height	11"	13"	15"	17"

WESTMORELAND Metal Mfg. Corp. · Milnor and Bleigh Streets · Philadelphia, Pa.

SCHOLAR-LINE PRESSED STEEL ADJUSTABLE CHAIR-DESK

NUMBER SCD 250 SCHOLAR-LINE CHAIR DESK



Designed with an eye to both practicability and appearance, this SCHOLAR-LINE Chair-Desk is mobile, highly durable, fabricated from heavy gauge steel. Easily adjustable, it is POSTURE-ENGINEERED for maximum seating comfort . . . is available in 3 Proportion Scaled sizes.

SPECIFICATIONS: No. SCD250 Chair-Desk

DESK TOP 7-ply hardwood. 12½" pencil groove. 3" vertical adjustment. Tightening of bolt locks desk top securely in position.

SEAT 5-ply hardwood. Contour rolled-seat front.

BACK RAILS 7-ply hardwood. Contour-bent under steam and pressure.

All plywood parts have birch veneered surfaces. Urea resin bonding under high heat and pressure assures no warping or separation of laminations.

DESK SUPPORT Heavy gauge steel, securely bolted to chair frame. Pressed steel spider affords maximum bracing.

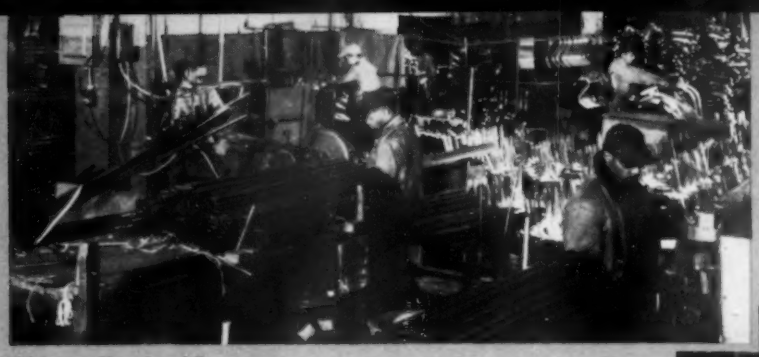
FRAME Sides are each formed from one piece heavy gauge steel, pressed to afford maximum strength and rigidity. Electrically welded to book compartment to provide exceptionally strong, durable one-piece unit.

BOOK STORAGE One-piece heavy gauge pressed steel.

GLIDES Rubber mounted, heavy nickel-plated.

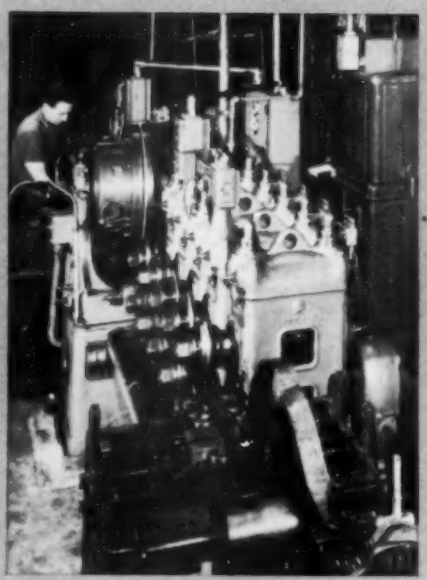
FINISH Wood surfaces are smooth-sanded, and finished to a rich, lustrous honey-blond color. Metal surfaces are School Brown. All metal parts are Bonderized, and SPRAYED TWICE and INFRA-RED BAKED TWICE at 375° Fahrenheit to insure our guarantee against rust, peeling, flaking or discoloration. Other wood and metal finishes to special order.

Style No.	Seat Height	Seat Size	Top Size	Desk to Back
SCD250/13	13"	12" x 11"	13" x 18"	9¼"
SCD250/15	15"	14" x 13"	14" x 20"	10¾"
SCD250/17	17"	16" x 15"	16" x 22"	12¾"



Tube cut-off and welding

AT EVERY POINT
in the design and manufacture of WESTMORELAND school furniture, skilled engineering and workmanship assures a uniformly high quality product . . .
In our laboratory, each new design undergoes severe abuse tests for both quality and performance. And, as an added check, units are regularly selected from the assembly line; carefully examined to see that they continue to meet typical WESTMORELAND-high standards!



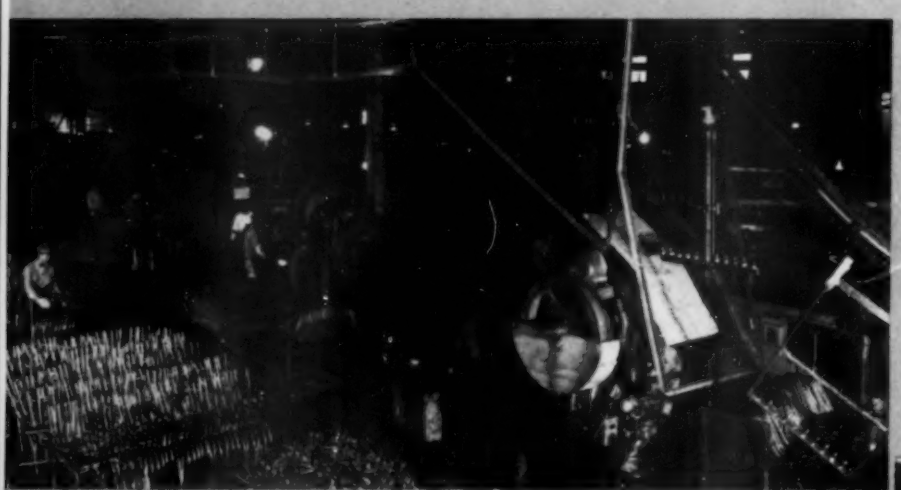
Tube mills. Continuous automatic process forms tubing from flat strip steel.



Tube polishing

PICTURED ON THIS PAGE are some of the men and machines responsible for the production of WESTMORELAND product

Because of these men and machines, and beca of our highly efficient modern production methods, WESTMORELAND fabricates school furniture at an economy which anticipat even the most restricted budget . . .



Press Department where tubular chairs are formed



Deburring the tubes

DESKS OF AMERICA, INC.

Bridgeport 6, Conn.

BUSINESS TRAINING DESKS MEET SCHOOL NEEDS



No. 23540 Dual-Purpose Art Desk

The adjustable drawing tablet of this dual-purpose art desk elevates within 10° of vertical and measures 36″ x 20″ x 30″ high. The stationary desk surface is 12″ wide by 20″ deep, making the desk extremely versatile. There is also a handy utility drawer for art supplies. The operating mechanism for raising and lowering the drawing tablet is automatic silent gear type operation.



No. 23511 Adjustable Typing Desk

The typewriter shelf on this desk adjusts to 26″, 28″, or 30″ permitting the student to type at his most comfortable height, while using standard classroom seating. This unit features heavy-duty construction, engineered for lifetime rigidity. The typewriter well measures 16½″ x 14¾″ deep and accommodates both manual and electric typewriters. This desk has been especially constructed to absorb all shocks and vibration.



No. 23000 Typewriter Desk OPEN

The Dual-Purpose Typewriter Desk No. 23000, shown in the open position at left and closed below, saves the construction cost of at least one classroom! It can be used for typing, bookkeeping, accounting, shorthand and general business training classes.

These desks, which are specifically designed for classroom use, measure 36″ x 22½″ x 30″. Between 36 and 40 units can be accommodated in the average classroom as compared with only 12-18 standard office furniture desks. In addition, these desks have been designed to duplicate the office situation in which the student will later work.

Equipped with a patented raising and lowering mechanism for the typewriter, this desk has been engineered so that there is no pull or effort required to bring the typewriter into the desired position.

WOOD CONSTRUCTION
ABSORBS VIBRATION

No. 23000 Typewriter Desk CLOSED



Also manufacturers of stationary typewriter desks, bookkeeping desks and comptometer desks. Write for free copy of catalog and specifications.

ARLINGTON SEATING COMPANY

Arlington Heights, Illinois

Here is modern seating equipment, to meet the needs of every type of classroom and grade. Major types of equipment are shown and briefly described. Complete information is available by writing for Arlington Catalog No. 54. All Arlington equipment is guaranteed in workmanship and quality of materials . . . the guarantee of a firm with a reputation for dependable service for over fifty years. Your inquiry is invited and always welcome.

THE MOVE ABOUT No. 550

Designed to meet every requirement of the modern coordinated classroom. Range of sizes plus adjustability of both desk and seat permit comfort and healthful posture for every grade. Natural rest position of lid is 10° slope for comfort in reading, writing and drawing. Lid also adjusts to level for manipulative projects.

Seat swivels up to 45° to left or right for comfort and correct body posture. Spacious book box gives ample room for storage with easy accessibility. Friction hinges hold lid up until pushed down . . . protecting hands and fingers. Available in three popular sizes:

Size A, grade 5 to adult . . .
Size B, grade 2 to 6 . . .
Size C, grade 1 to 3.

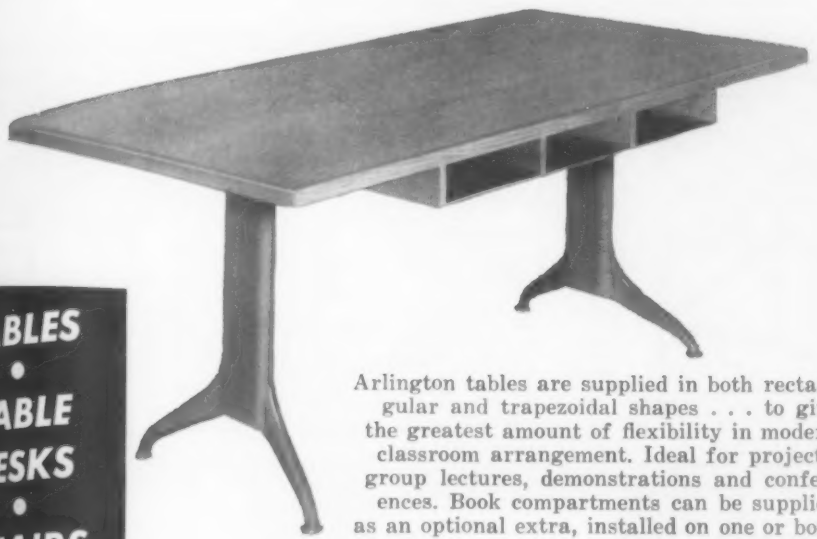


MOVABLE CHAIR DESK No. 101

A comfortable, durable desk, styled for today's school. Built on the famous Arlington Uni-Steel principle that gives strength without excess weight. Unnecessary projections are entirely eliminated by smooth, flowing lines. Wood parts finished in natural lacquer. Metal parts in special baked enamel. Writing surface is made of carefully conditioned solid hardwood. Posture-right seat and back support members are of Hi-bond resin laminated construction. Adjustment of desk height is easy . . . positive clamp holds desk top firmly in desired position. Rubber cushioned steel feet are standard equipment. Inkwells and closed end panel on right side of desk, can be provided at small additional cost. Three sizes: Size A, grade 6 to adult . . .
Size B, grade 3 to 6 . . .
Size C, grade 1 to 3.



ARLINGTON SEATING COMPANY





TABLES • TABLE DESKS • CHAIRS

Arlington tables are supplied in both rectangular and trapezoidal shapes . . . to give the greatest amount of flexibility in modern classroom arrangement. Ideal for projects, group lectures, demonstrations and conferences. Book compartments can be supplied as an optional extra, installed on one or both sides.

Individual table desks are available with either stationary or lift tops. Center post design reduces chair movement and floor space requirements to a minimum. The All-Purpose Chair shown at right is a durable unit for use with tables or table desks.



TABLET ARM CHAIR No. 202

A scientifically engineered chair, attractive in appearance, light in weight, yet built to withstand rugged everyday use in the classroom. Posture correlated seat and back support members are of Hi-bond resin laminated construction. Spacious book compartment. 11½" x 24" sloping hardwood writing surface. Wood parts are finished natural. Metal parts are durably finished with Arlington special baked enamel. Rubber cushioned steel feet are standard equipment.



Other products in Arlington's complete seating equipment line are: study top desks; typing desks, for high school or adult use; stadium chairs; and chapel seating. You will find detailed information on these and many other items in Arlington Catalog No. 54. A free copy will be sent to you upon request.

send for this free catalog!

HEYWOOD-WAKEFIELD COMPANY

Heywood-Wakefield • School Furniture Division • Gardner, Mass. and Menominee, Mich.



Table-Desk S 1039 OF (in nine graded sizes) and All-Purpose Chair S 915 (in eight graded sizes).



Table-Desk S 1040 LL with enclosed book box. In nine graded sizes.



Tablet Arm Chair S 817 —a comfortable unit for lecture hall or classroom.



Tablet Arm Chair S 819 TA—an ideal unit for High School and College classes.



Movable Desk and Chair Unit S 501 LL for primary and elementary classrooms. In seven graded sizes.



Movable Study-Top Chair Unit S 501 STBR—for classrooms from Junior High through College. In seven graded sizes.

FOR ALL YOUR NEEDS . . . from

HEYWOOD-WAKEFIELD COMPANY

Heywood-Wakefield • School Furniture Division • Gardner, Mass. and Menominee, Mich.

Table S 967 with damage-resistant plastic top. For cafeterias, domestic science rooms and special-purpose rooms. In 36 graded sizes.

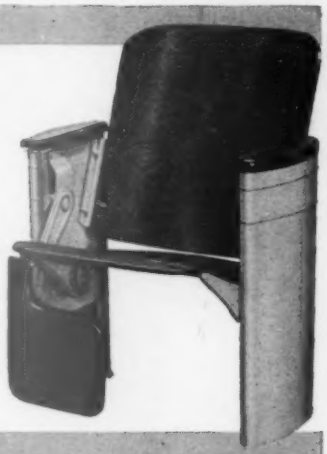


Table S 962—versatile unit for Kindergartens, cafeterias, libraries, special classrooms and many other uses. In 36 graded sizes.



TC 700 Auditorium Seat with coil spring seats and comfortable padded back.

TC 613 Tablet-Arm Chair for use whenever auditorium must also serve as lecture hall.



Lightweight, exceptionally strong and durable . . . Heywood-Wakefield ORIGINAL Tubular Steel School Furniture is adaptable, functional furniture for modern schools. It is available in an unusually wide range of types and graded sizes for classrooms and auditoriums from kindergarten through college. Write today for our free, completely illustrated catalogue.

Heywood-Wakefield • School Furniture Division
Gardner, Mass. and Menominee, Mich.

Classroom to Auditorium

HEYWOOD-WAKEFIELD
EST. 1826

KNOLL ASSOCIATES, INC.

575 Madison Avenue, N. Y. 22

Boston, Chicago, Dallas, Detroit, Miami, Washington, D. C. ● Factory, 36-30 Steinway St., Long Island City, N. Y.

MANUFACTURERS OF CONTEMPORARY FURNITURE AND TEXTILES



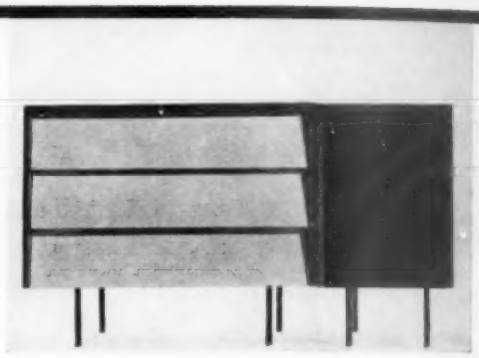
Trinity University Lounge
no. 61U arm chair / 26 sofa / no. 306



no. 420-3 side chair



no. 708 bed / 155 chest / 130 chair



no. 135 / no. 137 chests



no. 70 lounge chair / no. 74 ottoman



L to R: no. 140 / no. 141 / no. 142 stacking chairs

KNOLL ASSOCIATES, INC.



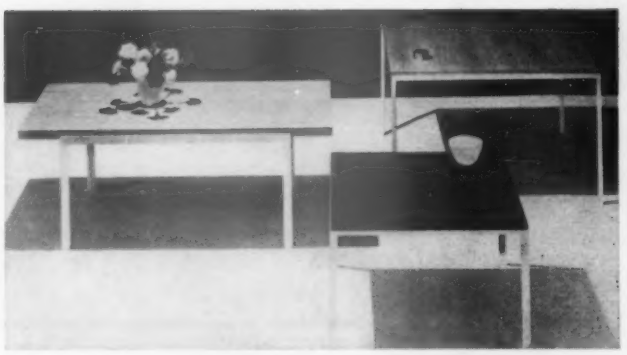
L to R: no. 666W / no. 66WSP / no. 666U



no. 49 arm chair



L to R: no. 652W / no. 654U½ / 654U



L to R: no. 306 / no. 304 / no. 305



University of Michigan Men's Dormitory study area / no. 48 chair

Knoll Associates, Inc. designs and manufactures contemporary furniture and textiles of utility and beauty to meet the demands of institutional use. Write for brochure and further information. For 60-page catalog "Index of Contemporary Design," send $5.00 plus 25c postage in U S or Canada [no COD]

KNOLL

IRWIN SEATING COMPANY

Grand Rapids, Michigan



THE IRWIN UNI-DESK

No. 454

ONLY THE IRWIN UNI-DESK PROVIDES *ALL* these IMPORTANT FEATURES — COMPARE	IRWIN UNI-DESK	DESK A	DESK B	DESK C	DESK D
ONE PIECE DESK TOP	X				
G-E TEXTOLITE DESK TOP	X				
ONE PIECE FORMED STEEL BOOK BOX	X	X	X		
OUTSIDE ROLL ON BOOK BOX EDGES	X				
CONVEX EMBOSSING ON BOOK BOX BOTTOM	X				X
BOOK BOX AND CHAIR ADJUSTABLE FOR HEIGHT	X	X	X	X	
LONGITUDINAL FRAME ADJUSTMENT	X				
CRADLE-FORM SEAT	X	X			
90° SWIVEL SEAT	X	X	X	X	
AUTOMATIC SELF-LEVELING DEVICE	X				
HARDENED AND POLISHED RUBBER CUSHION GLIDES	X			X	X

SEATING COMPANY IRWIN GRAND RAPIDS, MICH.

The definite superiority of the IRWIN UNI-DESK exemplifies the comprehensive design and sound construction characteristic of the entire IRWIN line which includes seating for every school and auditorium requirement. To make your budget do maximum duty write for the IRWIN catalog, NOW.

NORCOR MANUFACTURING COMPANY

Green Bay • Wisconsin

FOR BETTER SCHOOL AND INSTITUTIONAL SEATING ...SPECIFY NORCOR

For school furniture that is designed to fit growing children, with comfort and good posture built into each chair and desk—that is built to withstand hard school room service without sacrificing light weight and easy mobility —that is planned to fit the modern classroom—specify Norcor. A complete line of desks and chairs, chair desks, tables and folding chairs is offered.



NORCOR "500 Series" CHAIR DESKS

Modern seating at economy costs. Generously sized desk top is adjustable to 3 positions and adjusts forward as it is raised to allow ample room for the heavier larger pupil. Strong, formed angle construction makes this an exceptionally sturdy chair desk. Scientifically designed for maximum comfort and good posture.



NORCOR "500 Series" TABLET ARM CHAIR

The "Desk Styled" Tablet Arm Chair, with extra large tablet arm of unique shape that provides large work surface. Also available with standard sized tablet arm.



NORCOR TUBULAR DESKS AND CHAIRS

Strong but light in weight, scientifically designed for maximum comfort and correct posture. Perfect for the modern "flexible" classroom and made in a complete range of carefully graded sizes suitable for pupils from kindergarten to college.



NORCOR TABLES

Designed for use wherever a table seating groups from 4 to 8 is desirable. Built in four sizes ranging from 24" x 48" to 36" x 72" with legs of varying heights. Table tops are available in 7/8" solid core balanced plywood or plastic top. Available with or without book compartments.



FAMOUS NORCOR FOLDING CHAIRS

At left, the outstanding Norcor 302, the safest, strongest, most comfortable folding chair built today. At right, one of the 180 Series, with strong, x-braced channel steel frame. Folds to 1 inch depth, conserves storage space.

OUR REPRESENTATIVES WILL BE GLAD TO ASSIST YOU WITH YOUR SEATING PROBLEMS.
WRITE Dept. AU.

The NORCOR Line

THE NORCOR MANUFACTURING COMPANY, INC.
GREEN BAY, WIS. • PORTSMOUTH N. H.

E. W. A. ROWLES CO.

Manufacturers of School Equipment, Classroom Seating and School Furniture

Arlington Heights, Illinois

CLASSROOM SEATING & SCHOOL FURNITURE





It Stacks!

Rowles SPACE-MASTER DESK & CHAIR UNIT

A new idea in classroom seating. Combines all the fine features of good classroom seating with a modular design that enables the desks and the chairs to be "stacked" and stored in a corner or against the wall. Provides a practical way to clear the classrooms, and store the chair and desks so that the room may be used for other purposes. A very flexible unit with unlimited applications.



Rowles MODERNAIRE CHAIR DESK

A beautiful streamlined design combined with superb construction features make this an outstanding value in classroom seating. An exceptionally strong unit with one-piece side frames welded to cross members. Modern styling, comfortable and made to last for years and years. Designed to encourage better posture control and assurance of day-long comfort. Large writing surface with adjustable height.



Rowles MASTERMADE DELUXE MOVABLE DESK

Everything you could ask for in good classroom seating. Beauty, style, durability, good posture control, big book box, large over-size writing surface, swivel seat, lift lid. All these plus many new improved features make the MASTERMADE DELUXE DESK the kind of a desk that you've always been looking for.

Rowles SCHOOL FURNITURE

Rowles offers a complete line of classroom seating, school equipment, school furniture, library equipment, office desks, tables, chairs, file cabinets, folding chairs, teachers desks, primary equipment, cabinets, etc.

See your local ROWLES SCHOOL EQUIPMENT DEALER



Ask your local Rowles School Equipment Dealer for a copy of these two new Rowles Catalogs showing the complete line of Rowles Classroom Seating and Rowles School Furniture.

ROWLES School Equipment

E. W. A. ROWLES COMPANY
ARLINGTON HEIGHTS, ILLINOIS

SCHOOL INTERIORS CO.

5 University Place, New York City, N. Y. • 316 N. Michigan Avenue, Chicago, Ill.







modern stacking furniture

A complete line of stacking furniture for nursery, kindergarten and primary school groups. The stacking principle allows maximum flexibility in seating: is ideally suited to small classroom and library... to nursery school and any schoolroom which serves varied groups or programs.

Write for complete catalog showing tables, chairs, desks, cots, storage units, other classroom and play equipment.

5 University Place, New York 3, N. Y.
316 N. Michigan Avenue, Chicgo, Ill.

school interiors co.

SEATS & DESKS, INC.

218 So. Wabash Ave., Chicago 4, Illinois

NEW HORIZONS
in QUALITY–SERVICE–ECONOMY



FEATURES:

1- "SAFETY" CHAIRS . . . design minimizes tipping backward.

2- "WALL-SAVER" feature of chairs eliminates wall marks and scratches.

3- Desks may be either open front or lifting l'd. Top may be solid maple, plywood or plastic.

4- Seats and backs of "SAFETY" chairs either hardwood, plywood or solid maple.

5- Toughest wood and metal finishes.

6- Cost economies that s-t-r-e-t-c-h your budget.

MANY OTHER POPULAR SCHOOL FURNITURE ITEMS AVAILABLE

Write for Complete Specifications Before You Buy School Furniture

DISTRIBUTORS IN PRINCIPAL AREAS

WILLIAMS AND BROWER, INC.

Siler City, North Carolina

Well Built **MODERN SCHOOL FURNITURE Designed for UTILITY — — SERVICE**



NO. 3000 PRIMARY TABLE

Height: 22″ through 30″
Available Top Sizes: 24″ x 48″, 30″ x 60″, 30″ x 72″
Top Thickness: $^{13}/_{16}$″ or 1¼″
Made of Beech in Natural, School Brown or Warmtone
With Pockets

NO. 400 TABLET ARM CHAIR

Seat: 18½″ wide x 17″ deep
Tablet Arm: 23½″ long x 12½″ wide
In Beech or Oak with Beech Tablet
Finish: Natural, School Brown or Warmtone
Exceptionally comfortable and serviceable



NO. 617 MOVABLE CHAIR DESK



These Movable Chair Desks are made in three heights and sizes: No. 613—13″ seat height; No. 615—15″ seat height; No. 617—17″ seat height.

NO. 1400 CHAIR



No. 1400 chairs have full saddled seats, double dowelled throughout. Of thoroughly kiln dried Beech, in Natural, School Brown, or Warmtone
Sizes: 10″ through 18″

NO. 1400 DESK AND CHAIR UNIT

All No. 1400 Chairs, Movable Chair Desks, and Tablet Arm Chairs have special lock-joint corner block construction
No. 1400 units are made in four standard sizes:
A Size: Desk 29″ and Chair 17″
B Size: Desk 26″ and Chair 15″
C Size: Desk 23″ and Chair 13″
D Size: Desk 22″ and Chair 12″
All 1400 desks have 18″ x 24″ tops with a 4½″ book compartment. Pencil grooves are standard equipment. Both desks and chairs are designed for maximum comfort, appearance and service.
Made from Beech lumber, thoroughly kiln dried and finished either in Natural, School Brown or Warmtone.



W & B WELL BUILT

WRITE FOR NAME OF AUTHORIZED DISTRIBUTOR IN YOUR STATE

FIBERESIN PLASTICS COMPANY

Oconomowoc, Wisconsin

THIS BOY'S CHILDREN WILL WRITE ON THIS DESK...

because

FIBERESIN* Desk Tops



Typical Completely Serviceable Desk starting life over with an easily installed FIBERESIN DESK TOP.

WERE JUST INSTALLED

His school had good, serviceable desks, but with tops showing the tell-tale signs of "doodling" and "trenching". They were replaced with FIBERESIN, the durable, smooth, ripple-free surface with proper light reflectivity, designed for student use. No layers to peel off and no additional edge moldings to bend, break, or catch dirt. Actually, FIBERESIN Desk Tops installed now will be serving the children of your present students, and will look and perform as well then as now . . . with no maintenance except an occasional wiping off with a damp rag.

Leading manufacturers of school desks have selected FIBERESIN Desk Tops for original equipment as the result of exhaustive tests carried out to find a material suitable for the extreme wear and abuse encountered by desk tops.

DON'T KEEP ANTIQUES!

If new, modern, functional desks are needed in your schools, be sure to specify FIBERESIN Desk Tops to assure maximum quality and wearability.

DEVELOPED and PIONEERED by

FIBERESIN®
PLASTICS COMPANY
OCONOMOWOC, WIS.

✓ The tough plastic surface is virtually indestructible. Staining, chipping, cracking, and scratching are practically impossible. No warping, no veneer layers, no metal or wood edges to create hazards.

✓ The FIBERESIN surface scored A+ in reflectance tests conducted by the University of Wisconsin showing ideal reflectance value of 40-50% . . . no unnecessary eye strain.

✓ Maintenance is no problem. Marks and stains are readily removed by wiping with damp cloth. Never needs refinishing.



* FIBERESIN—a laminated board having a melamine resin plastic surface on an extremely dense core of wood fiber and phenolic resin. This combination of materials is welded together in hydraulic hot plate presses at high temperatures and pressures. The decorative wood grain pattern and color is an integral part of the surface.

Of course, it's FIBERESIN for REPLACEMENT PROGRAMS as well as for NEW EQUIPMENT

THE FORMICA COMPANY

4533 Spring Grove Avenue, Cincinnati 32, Ohio

If every school day they were like this-



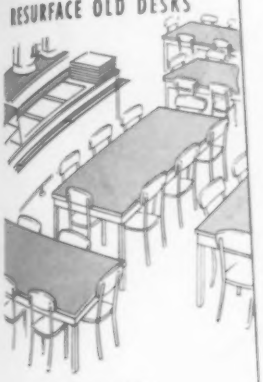
you wouldn't need FORMICA surfaces

but, they're not and you do!

Formica Topped Desks by Griggs Equipment Co., Belton, Texas



RESURFACE OLD DESKS



CAFETERIA TABLES AND COUNTERS



WINDOW STOOLS



HOME ECONOMIC KITCHENS



WORK TABLES

There is nothing like FORMICA but FORMICA itself

Beautiful rugged Formica is as close to being child-proof as you could ask. It resists scratching and stains of all kinds. Ink, pencil, crayons and just plain dirt wipe off with only a damp cloth.

In ordering new desks and tables specify to the manufacturer that you want Formica tops. Present school furniture can be resurfaced with Formica by regular Formica fabricators or in your own woodworking shops.

Cafeteria tables and counters are ideal for Formica in more than 100 color patterns and wood grains. Home economic kitchens and window stools need Formica for beauty and utility.

Write *Formica for the name of a fabricator near your school or for "on the job" instruction in Formica applications.*
Write FORMICA, 4533 Spring Grove Avenue Cincinnati 32, Ohio

Beauty Bonded FORMICA Reg. U.S. Pat. Off.

Guaranteed by Good Housekeeping

Pays in Performance

THE BREWER-TITCHENER CORPORATION

118 Port Watson St., Cortland, N. Y.

BTC

Hostess FOLDING CHAIRS BANQUET TABLES



Featherlight Folding Banquet Table

Here's the table that sets a new standard in folding furniture! HOSTESS Featherlight Banquet Table is extremely lightweight—6 ft. table weighs only 45 lbs; 8 ft. only 55 lbs. Modernly designed, airplane type construction, all-steel frame, mar-resistant Tauplon or Formica top. Square tubular steel legs are properly spaced to allow ample knee-room at all sides. Legs are fully braced, paired for fast set-up and take-down—have the most positive, easily operated catch on the market. Write for folder.

PMM-6-30—Tauplon top. 72″ x 30″ x 29″ high. Seats 8.

PFF-6-30 —Formica top. 72″ x 30″ x 29″ high. Seats 8.

PMM-8-30—Tauplon top. 96″ x 30″ x 29″ high. Seats 10.

PFF-8-30 —Formica top. 96″ x 30″ x 29″ high. Seats 10.

Packed 2 per carton.



HOSTESS Folding Chairs

- 14 handsome finishes
- 15 beautiful plastic coverings

Choose the chairs that are made for long years of service— BTC HOSTESS Folding Chairs! They have husky, all-steel frames—are unmatched for beauty, durability and comfort. Non-squeaking, easy to set up and take down. Full-sized seats and backs fold together to protect upholstery in storage.

Specifications: Improved "X" type construction with anti-collapse closing. All-steel, riveted for strength. Rubber foot pads. Choose back and seat upholstery from 15 colorful Duran or Boltaflex plastic coverings. Choice of 14 rich baked enamel finishes. Packed 6 chairs per carton. Write for folder.



STANDARD Folding Banquet Tables

Practical, handsome answer to dining service in multiple-use rooms. Husky all-steel construction, fully-braced legs, positive locking catch, ½″ fir plywood top sealed on both sides and hot-spray lacquered. Packed 2 per carton.

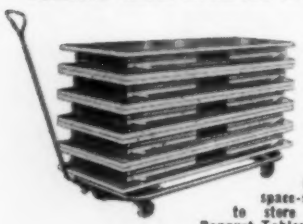
P-6-30—Plywood top. 72″ x 30″ x 30″ high. Seats 8.

P-6-36—Plywood top. 72″ x 36″ x 30″ high. Seats 8.

P-8-30—Plywood top. 96″ x 30″ x 30″ high. Seats 10.

Round Table seats 8, packed 1 per carton:
P-R-60—⅝″ Plywood top 60″ diam. x 30″ high.

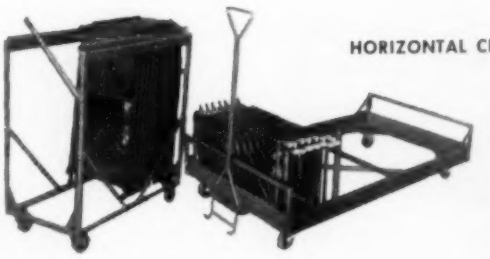
FOLDING TABLE STORAGE TRUCKS



Convenient, space-saving way to store HOSTESS Banquet Tables. Holds 12 tables. All-steel construction. 68″ long x 32″ wide. Detachable towing handle, rubber-tired wheels. Trucks stack when not in use.

VERTICAL CHAIR TRUCK

Allows one man to gather, move and store 24 HOSTESS Chairs with ease. 19¾″ wide x 42″ long x 44″ high without chairs.



HORIZONTAL CHAIR TRUCK

Built for understage storage. Holds 36 chairs — can be hooked in tandem. 37¾″ wide x 64¾″ long x 23½″ high with chairs.

HOWE FOLDING FURNITURE, INC.

1 Park Avenue, New York 16, N. Y.

Telephone: MUrray Hill 5-5925

America's broadest line of folding tables for schools and universities

Howe folding tables are especially designed for comfortable seating, fast handling and rugged wear. They're light, strong—and practically indestructible. They fold smoothly and take up minimum space when not in use.



HOWE
Square Leg Table

All steel chassis. A brace at each leg for extra strength and a leg at each corner for engineering balance. Riveted and welded throughout. Choice of several different tops and sizes. Ample leg room at both ends and sides.



HOWE
Pedestal Leg Table

All steel chassis with retreating leg fold. Strong, foolproof lock with self-tightening principle. Two separate braces for each pair of legs. Braces are riveted to chassis. Choice of several different tops and sizes. Ample leg room at both ends and sides.



10 SECONDS TO OPEN OR CLOSE
Just press foot on lock, lean forward, bring hands together and your weight folds table. Then fold benches. Entire operation of table and benches is done automatically from one end.

New HOWE Folding Bench and Table Combination



This flexible and multipurpose bench and table combination is wonderful for classroom, cafeteria, gym and many other uses.

RUGGED BATTLESHIP CONSTRUCTION

- Top is ⅞" thick with fir plywood core and 1/16" tan linen plastic on top and bottom. "T" aluminum molding edge around top.
- Benches are 1" thick, hard wood. Taupe finish.
- Legs are 1" heavy gauge steel cadmium plated. Bench legs have metal, mar-proof glides on rubber cushions. Table legs have 3" double ball bearing rubber casters.

Dimensions: Table—30" x 72" x 27" high. Benches—9½" x 72" x 16" high. Folded position—17½" x 72" x 38½" high. Open position—55" wide.



TWO TIER BLEACHER
With table and one bench open it can be placed against the wall and be used as a two tier "bleacher".



ROOMY
Benches allow for greater seating capacity. Lots of elbow and leg room.



NO LIFTING OR LUGGING
Folds compactly and can be moved from place to place with ease. One person can walk away with two units—they just "float" along.



BENCH WITH BACK REST
When table is folded and one bench open, it can be placed against the wall for seating. Comfortable, slanting back rest.

If it folds— ask HOWE!

MITCHELL MANUFACTURING CO.

2772 S. 34th Street, Milwaukee 46, Wisconsin

for CHANGING ROOM USES



LEGS FOLD UNDER FOR STORAGE

GENUINE *Mitchell* FOLD-O-LEG *tables*

GENUINE MITCHELL FOLD-O-LEG TABLES

THE STRONGEST, HANDIEST, FOLDING TABLES MADE!

CONSTRUCTION FEATURES: Smooth, clean, sanitary tops unmarred by rivets, nails or screws. Tops completely reinforced by ¾" plywood underframe to eliminate weakness and flexibility. Strong welded steel channel apron reinforces top and underframe for greater rigidity. Table top edges protected with Beige colored plastic moulding which absorbs shocks without denting or splintering. New combination LEVEL-STACK corner plate and rounded corner keeps tables level and steady when stacked by preventing corners from meshing. Rounded corner adds safety. Tubular Steel Leg assemblies thoroughly welded into one strong unit. Proper pedestal arch width prevents tipping. Legs equipped with steel floor glides. All metal parts finished in a pleasing Bryce Beige colored enamel. Extra-heavy steel patented jackknife folding brace eliminates rattle, end play and wobble. Simple strong compression lock easily operated with one hand.

All tables made 29" high for adult use. 22", 24" or 27" heights can be furnished for children or older youth groups.

Exclusive Patented Features give MORE: Seating Capacity, Leg Comfort, Strength, Rigidity, Long Life and Service . . .

STANDARD FOLD-O-LEG TABLES

Size	Masonite Presdwood Tops	Birch Plywood Tops	Fir Plywood Tops	Resilyte Tops	Formica Tops	Linoleum Tops
	Model No.	Model No.	Model No.	Model No.	Model No.	Model No.
96" L. x 30" W.	M-1	B-1	F-1	R-1	P-1	L-1
72" L. x 30" W.	M-3	B-3	F-3	R-3	P-3	L-3
96" L. x 36" W.	M-9	B-9	F-9	R-9	P-9	L-9
72" L. x 36" W.	M-11	B-11	F-11	R-11	P-11	L-11
48" L. x 30" W.	M-19	B-19	F-19	R-19	P-19	L-19

SPECIAL FOLD-O-LEG TABLES

36" L. x 36" W.	M-20	B-20	F-20	R-20	P-20	L-20
48" L. x 30" W.	M-21	B-21	F-21	R-21	P-21	L-21
36" L. x 30" W.	M-23	B-23	F-23	R-23	P-23	L-23

ABOVE SPECIAL TABLES MADE WITH "U" TYPE LEGS



KINDERGARTEN TABLES

Made in the same top sizes as standard FOLD-O-LEG Tables but in 22" heights, also in 24" and 27" heights for bigger children. Leg extensions easily convert these tables to regular 29" height for adult use.

ROUND FOLD-O-LEG TABLES

Made with ¾" 5-ply Fir tops. Continuous steel apron 1½" deep. Tubular steel legs fold into recess formed by apron. Legs and apron finished in Bryce Beige enamel. Top standard brown with plastic moulding edge.

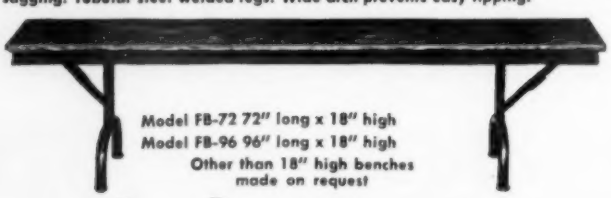


FIR PLYWOOD TOPS

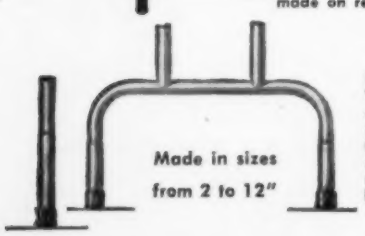
SIZE	MODEL NO.
48" round x 29" high	RF-12
60" round x 29" high	RF-13

FOLD-O-LEG BENCHES FOR CONVENIENCE

Tops of ¾" five-ply fir panels finished with two coats of varnish. Edges protected with plastic moulding to match tables. Steel channel aprons on long sides. New combination LEVEL-STACK corner plate. Benches 96 inches long have extra reinforcement to prevent sagging. Tubular steel welded legs. Wide arch prevents easy tipping.



Model FB-72 72" long x 18" high
Model FB-96 96" long x 18" high
Other than 18" high benches made on request



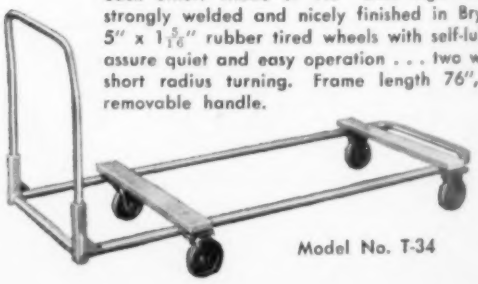
Made in sizes from 2 to 12"

LEG EXTENSIONS

Provide additional uses for FOLD-O-LEG TABLES. Kindergarten tables can be raised to regular 29" height, regular height tables can be extended to counter height for crafts or exhibit purposes. Patented expansion lock gives strong, secure connection. Easily removed. Including Rubber tips

TABLE TRUCK SAVES TIME AND LABOR

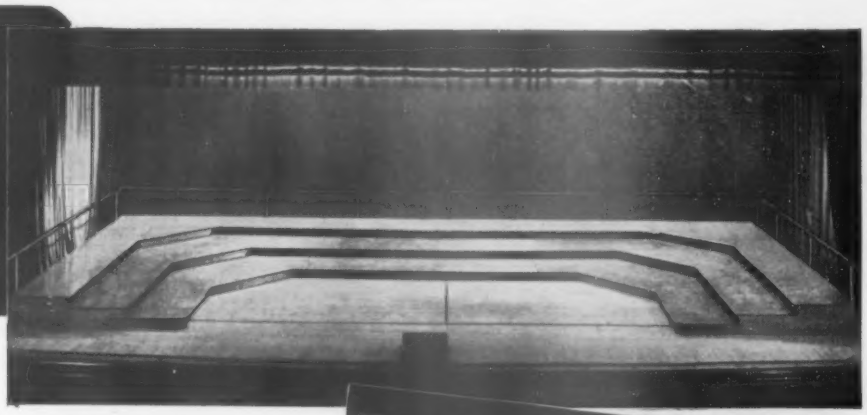
Easily carries 12 standard folding tables stacked on top of each other. Made of 1⅜" O.D. high carbon steel tubing, strongly welded and nicely finished in Bryce Beige enamel. 5" x $1\frac{5}{16}$" rubber tired wheels with self-lubricating bearings assure quiet and easy operation . . . two wheels swiveled for short radius turning. Frame length 76", width 26" with removable handle.



Model No. T-34

MITCHELL MANUFACTURING CO.

Mitchell PORTABLE FOLDING STANDS



EASY TO SET-UP
1, 2, 3 or MORE LEVELS
for BAND, ORCHESTRA, CHORAL and DRAMATIC GROUPS

Sturdy, safe, easy to handle units with strong tubular steel folding legs, ¾", 5 ply Fir plywood tops reinforced with a steel channel apron for greater strength and rigidity. Standard top size of one unit is 4′ x 8′. Units are made in heights starting with 8" and increasing by 8′ rises to form step-like arrangements as shown in the photographs.

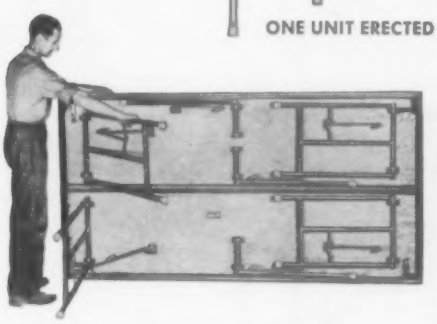
A complete Band Stand for 120 piece band can be stacked and stored in a space 4′ wide, 8′ long and 6′ high.

All genuine Mitchell products have: extra strong welded tubular steel leg assemblies and simple foolproof folding features.

They last longer because they are built stronger.







ONE UNIT ERECTED

LEGS FOLD UNDER FOR EASY AND COMPACT STORAGE

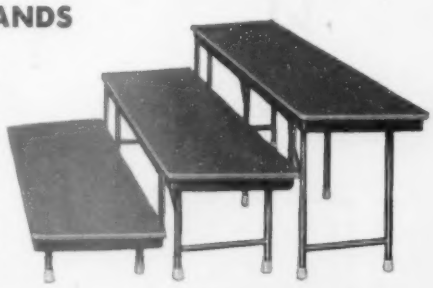
Bottom view shows how easily these units can be handled by one person. Legs fold flat against underside of top and do not extend below apron. This allows flat stacking one on top of the other for minimum storage.

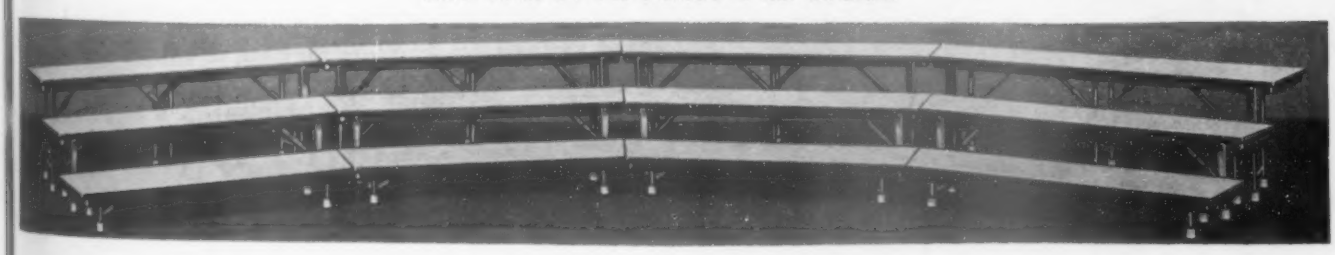
MITCHELL ONE-LEVEL STANDS

Photograph above shows a one-level platform set-up in a gymnasium. This type of installation has great flexibility of arrangement because the standard 8′ x 4′ units can be set-up as a complete platform to accomodate groups or a few units used for speakers platforms, runways etc. The portability of these units and the ease with which they can be set-up or removed and stored in minimum space, has made them most popular and most practical for school, church, hotel, lodge and many public and private uses.

MITCHELL *Portable* CHORAL STANDS

The complete Choral Stand for a standing group, as shown below, is composed of four sections, like the one shown to the right. Each section is three elevations high and of tapered design to produce the semi-circular stepped-up arrangement so popular for Choral Group performances. These units for standing groups have 18" wide tops. Each elevation has a rise of 8" above the other, the first being 8" above the floor. Units and sections lock and clamp together for safety and extra rigidity. Units for seated groups are made with 36" wide tops. Both standing and seated group choral stands are also available in four elevations.





MIDWEST FOLDING PRODUCTS

Dept. ASU, Roselle, Illinois

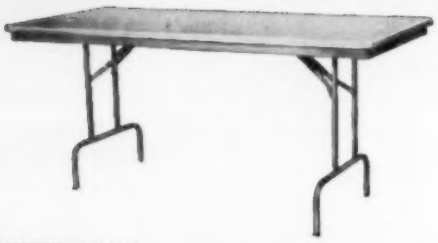
Midwest

FOLDING PRODUCTS

* FOR "BUILT-IN" BEAUTY
* FOR "BUILT-IN" STRENGTH
* FOR "BUILT-IN" DURABILITY

TOP MATERIALS AND FINISHES: Tops available in tempered MIDTEX, Plywood, General Electric "Textolite" plastic and linoleum. Finishes: MIDTEX in blond or brown, plywood in walnut or natural. Wide variety of colors available in plastic and linoleum. All metal parts in taupe baked enamel.

TABLE SIZES: 30" x 96", 30" x 72", 30" x 60", 30" x 48", 36" x 96", 36" x 72". Standard Height: 29½" (also available in 22", 24", 26", 28"). 12 Tables stack into a 30" height when folded.



MIDWEST PEDESTAL LINE

Designed for easy maintenance and unusual durability, Midwest's Pedestal Line has become a favorite of Institutions and businesses everywhere. The Pedestal Table has a strong steel apron, with rounded corners for added beauty and safety. Bottom of the pedestal is off-set to facilitate end seating and between-table seating. Standard double braces, with fool-proof "Du Honey 20" Locks. Plastic "T" molding edging.



THE MIDWEST STANDARD LINE—Here is a folding table unit which is light, easy to handle, and exceptionally sturdy, yet priced within everyone's budget. Straight legs and smooth top give table a sleek, modern look. Top is rabbeted into hardwood apron with steel corners. "Du Honey 20" automatic lock is your guarantee of stability and durability. Legs off-set to allow end seating.



MIDWEST SQUARE TABLES—Midwest's Square Table has met with great popularity because it is so solidly constructed . . . so easily handled. Round corners . . . extruded "T" molding . . . recessed steel apron. 30", 33" or 36" square.



EXTENSION LEG FEATURE—New creation extends the height of your shorter tables which can be used for dual purposes. It's positive . . . and can be applied in a jiffy . . . just snap it on.



MIDWEST ROUND TABLES

The answer to the need for a folding round table. To assure maximum seating and beauty at a minimum cost. Steel Apron and "Du Honey 20" automatic lock assures the same "wobble-free" stability that made Midwest a favorite choice of buyers everywhere. Available sizes 42", 48", 54" and 60" round.





THE HALF-ROUND TABLE—With the addition of Midwest's neat looking half tables, you can amazingly increase the usability of end spaces . . . and smartly improve appearance as well. Built to the same specifications as the Midwest Standard Line, the Half Table also has the exclusive "Du Honey 20" automatic lock.



MIDWEST CHAIR CADDY

Popular Chair Caddies are made to carry practically all folding chairs manufactured. The frame is constructed from rolled steel channel, multiformed for maximum strength, and constructed to absorb considerable overload. Smooth action casters. Available from 5 to 10 ft. in length. All Midwest Caddies available with adjustable end bar features. Also a complete line of under stage models and Folding Table Caddies.

Distributors in all principal cities

Write for complete literature!

MIDWEST FOLDING PRODUCTS

DEPT. ASU • ROSELLE, ILLINOIS

THE MONROE COMPANY

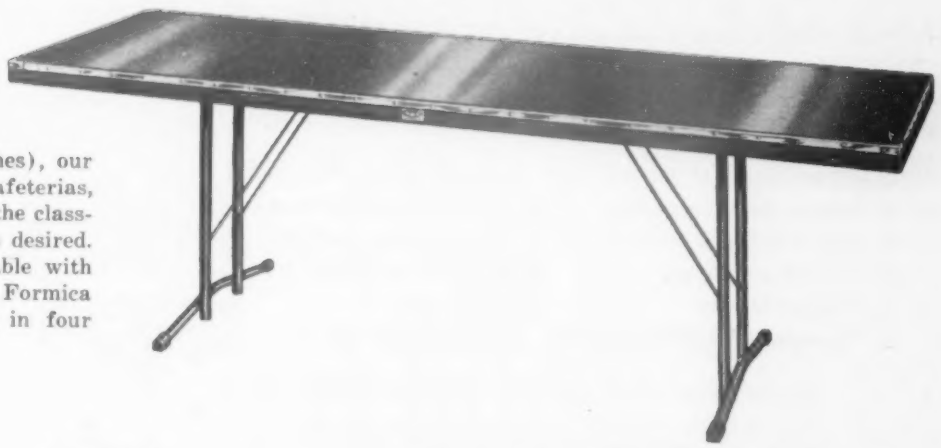
660 Church Street, Colfax, Iowa, Phone 670

Monroe **Folding Tables**

For Class and Cafeteria

DIRECT PRICES AND DISCOUNTS TO SCHOOLS, COLLEGES, CHURCHES, etc.

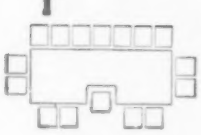
The DeLuxe #3 (30 x 96 inches), our most popular table for school cafeterias, is also ideally suited for use in the classroom whenever group seating is desired. Most Monroe Tables are available with Special Tops of Beauty-Bonded Formica or attractive, durable Ornacel in four colorful finishes.



KINDERGARTEN TEACHER'S FOLDING TABLES



There'll be more class interest, better control when Teacher sits with the class. (See seating chart at right.) Table fully adjustable from 20 to 30 inches.



ADJUSTABLE HEIGHT TABLES



For use in the Kindergarten or Intermediate Grades at any height, 20" to 30". When extended to full 30" may be used with other tables for adult dinners.

MANY OTHER MODELS AND SIZES IN OUR NEW CATALOG



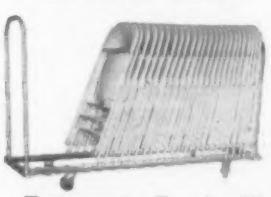
WRITE FOR NEW CATALOG, PRICES AND DISCOUNTS

MONROE TRUCKS FOR FOLDING TABLES AND CHAIRS

Store and handle Folding Tables and Chairs easily, quickly with Monroe Trucks.



By moving and storing Folding Tables and Chairs on Monroe Trucks, two men can clear a room six times more rapidly than when the tables and chairs are carried by hand. Table Truck No. TS illustrated above.



Transport Truck No. TF. Twelve Monroe Tables on Truck stack only 29" high.

Chair Truck No. TSC transports and stores up to 40 chairs, depending on make.



THE *Monroe* Company

660 CHURCH STREET — COLFAX, IOWA

SHWAYDER BROS., INC.

Public Seating Division, Dept. 12A, Detroit 29, Michigan

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Only Samsonite gives you all these *extras* AT NO EXTRA COST!

1. Tubular Steel Construction
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6. Bonderized to Resist Rust
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Most popular because it's the strongest all-steel chair made. No other chair beats it for wear. Non-chip automobile enamel finish. Sets up and stores in less time, less space. #2600.





SAMSONITE UPHOLSTERED FOLDING CHAIR
New heavy-duty Samsonite Vinyl covering (50% sturdier than ordinary Vinyl) on a comfortable padded seat. Compound-Curved back for better posture. Model #2700. Also available with Genuine No-Sag Springs, Model #2900.



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New 5-ply Tablet Arm of selected hardwoods folds with chair. Tubular steel legs and frame. Compound-Curved Posture Back. Perfect for any meeting, lecture and class-room ... or cafeterias. Model #2625. With padded Vinyl seat. Model #1723.



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LOOK FOR THIS SEAL
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Samsonite
FOLDING CHAIR
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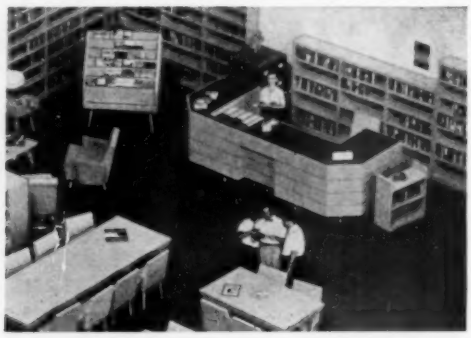
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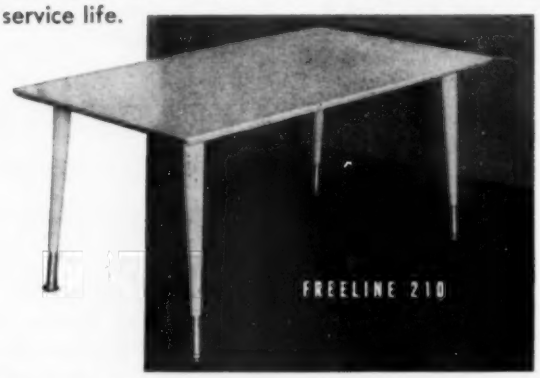
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Jamestown, New York
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Art Metal Serves the Educator in Administrative Offices and in Class Rooms

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FILE CABINETS • INDEXING SYSTEMS
VISIBLE FILES • BOOK SHELVES for
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This Administrative Office is typical of the way that Art Metal products and services meet the functional requirements of the school and college. In its design and construction, each unit reflects our 66 years of experience in providing the finest in equipment and systems for the office, library, classroom, and other departments of the educational institution.

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ART METAL TEACHERS' DESKS AND CHAIRS

For the finest desks and chairs made, choose from the complete Art Metal lines for executives, teachers and all other desk workers. Art Metal "Work Planned" desks have everything the modern classroom and office demands in good appearance, resistance to hard use, and convenience, with many extras found in no other desks. Art Metal "Correct Seating" Aluminum Office Chairs blend smart styling with exclusive Art Metal comfort features. They increase the efficiency and morale of teachers and others by reducing fatigue through correct seating. For other office chairs ask for catalog.



ART METAL
No. 703 Swivel Chair

Reduces fatigue, increases working efficiency. Seat 17½" W. by 16¼" D., height adjust. 17" to 20⅜".

ART METAL
No. 704 Side Chair

Seat and back: Fabric over foam latex cushion and contoured pan. Seat 17½" W., 16¼" D., 18" H. Overall height is 33 5/16".



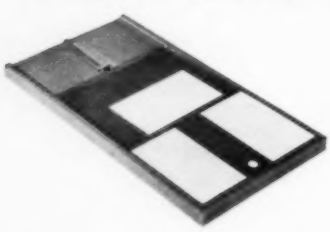
ART METAL TEACHERS' DESK, STYLE 1555FBR



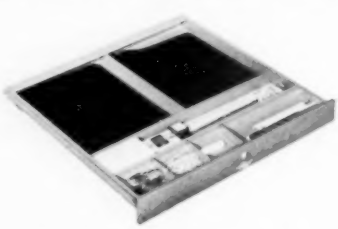
55" wide, 29" high, 30" deep. Front view (left) and rear view (right). Designed with end overhang for pupil conference, and many other special features developed as a result of a survey of teachers' requirements.



OPTIONAL DRAWER EQUIPMENT FOR ART METAL TEACHERS' DESK



Glass Covered Reference Slide for class schedule, reports, lists or other often-needed data.



Knee Space Drawer with extra compartments and rear sections for visible index and loose-leaf binders.



Vertical File Drawer—with two letter-size cross file trays, indexed if desired, for pupil records, etc.



Box Drawer with three adjustable sloping partitions and removable vertical partition.

The Art Metal Teacher's Desk in a typical elementary classroom. The double pedestal desk shown, Style 1555FB, provides drawer capacity equivalent to a standard two drawer file and still has two regular size box drawers which may be used for active and convenient storage of required classroom materials. The back of the desk is recessed to permit kneespace for students who confer with the teacher.



Functional Efficiency

FILES, COUNTER EQUIPMENT and BOOKSHELVES

There is an Art Metal File to meet every school office need in 2, 3, 4 or 5 drawer heights, for every standard size of record. A wide range of card record files provide for the varied sizes of pupil records which are required in most school administrative offices.

The use of Art Metal stock equipment offers an economical solution to many school installation problems. Because Art Metal equipment is standardized, "custom-type" arrangements can be designed in many combinations for the office without the need of special, more expensive contract work. Standard letter and legal drawer and card record files, Widesections, Halfsections and substitute drawer inserts permit the utmost in flexibility of arrangement.

ART METAL SCHOOL OFFICE COUNTER



The versatility and economy made possible by Art Metal standardized equipment is seen in this elementary school office counter. Composed of regular counter-height (3-drawer) files, with cabinets, it provides convenient record storage, smooth working tops. The 2-drawer section provides a place for use of small children.

ART METAL CONSTRUCTION CO., JAMESTOWN, N. Y.

ART METAL FILING CABINETS



Style 43417 [illegible] Drawer Letter File, [illegible] W., 41 13/16 H., 28 7/16 D.

Style 7441
5 Drawer Letter File,
14 15/16 W., 58 1/2 H.,
28 7/16 D.

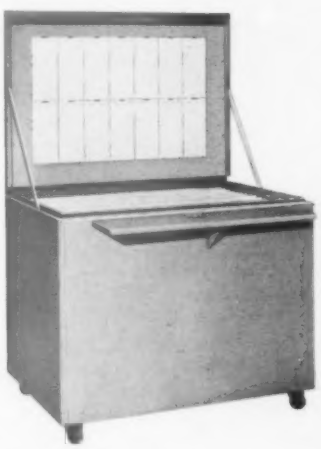
Style 7641
4 Drawer Letter File
14 15/16 W., 51 13/16 H.,
28 7/16 D.

Style 7341
2 Drawer Letter File
14 15/16 W., 30 5/16 H.
28 7/16 D.



ART METAL BOOK UNITS

Art Metal Space-A-Shelf Library Book Units are made with detachable finished ends so that one or more sections can be assembled into single stack units. These are permanently rigid—the shelves never work loose. Two Style 2000-A are illustrated. Sectional and Executive Book Cases in standard sections are made for convenient assembly to meet individual needs.



ART METAL PLAN FILES

The Superintendent of Buildings and Grounds will find the Art Metal Planfile ideal for filing of drawings, tracings and blueprints of school properties. The large number of plans often required by a school plant must be filed for easy reference by authorized persons and for protection against destructive elements. The Art Metal Planfile provides for these requirements by its simple filing system and special construction. And by keeping all drawings in perfect condition, and in order while filed, a Planfile quickly pays for itself by preventing lost, mislaid or damaged drawings that could easily cost more than a Planfile to be redrawn. Art Metal Planfiles are available in four sizes, for drawings up to 56" wide.

For Simplified Record Keeping

Art Metal
Jamestown, New York
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POSTINDEX "VISIBLE INDEX" FILES

STUDENT HISTORY
STUDENT HEALTH
DENTAL CARE
PHYSICAL EDUCATION
PERSONNEL
ADMINISTRATIVE
PURCHASING
STOCK CONTROL

• Send for our 32-page, "Modern Records for Schools," describing 23 records used in schools and colleges today.

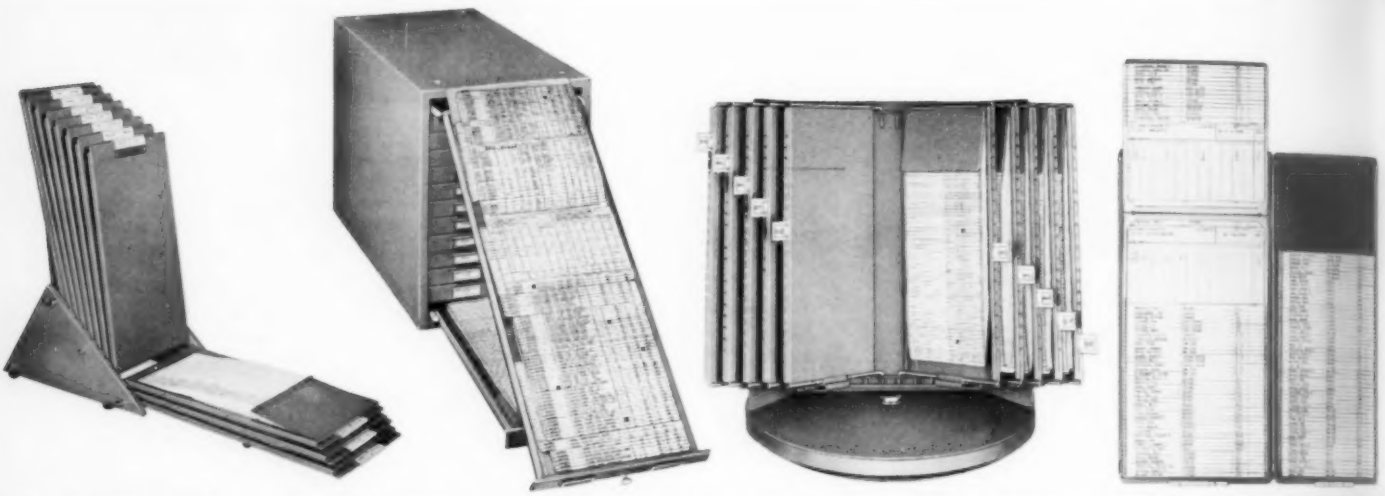


POSTINDEX "VISIBLE INDEX" FILES . . .

Visible Margins . . . the fastest means of reference ever developed.

4 *Sides to Write On* . . . for easy, rapid postings of records while they are current. An economy feature too.

Trunnion Wire Holder . . . snaps in, snaps out . . . the most flexible, fast, efficient means of adding, removing, or rearranging records.



POSTINDEX RAPID STACK • MODEL 8 DRAWER CABINET • ROTARY PROGRAM STAND • FLAT BOOK WITH POCKETS

POSTINDEX RAPID STACK — The fastest posting equipment available for jobs requiring exceptional speed . . . left hand "spots" the facts and does all the handling. Right hand is always free for posting. Records in vertical position . . . out of the way when not in use. Panels lift out and can be replaced instantly. Complete portability.

MODEL 8-DRAWER CABINET — Generally accepted as standard equipment for schools, the cabinets are made in seven styles: Standard, Deep Drawer, Extra Deep Drawer, Shallow Drawer, Hinge-Clip, Pocket Holder, Duplex—each designed to meet a wide range of specific needs. Available in capacities ranging from 500 to 2,500 records. Cabinets made in units of 7, 9, 12, 13, 18 and 20 drawers and a wide variety of card sizes. New improved slide suspensions.

ROTARY PROGRAM STAND — Provides for visible indexing of each pupil's daily program. Every record quickly, easily available. Each panel is doubly indexed and can be removed individually. Mounted on rotating base for easy reference to records from either side of a desk or counter.

FLAT BOOK WITH POCKETS — For frequent use by more than one person, Flat Books prove exceptionally valuable. Single Books are compact, fully protected, portable units. Existing card installations can be transferred to the Postindex way using pockets for 5 x 3, 6 x 4, and 8 x 5 cards. Capacities range from 64 to 240 records.

Flat-Books available for standard forms or cards from 3⅞" x 3" to 12" x 6".

FOR FURTHER INFORMATION ABOUT POSTINDEX SCHOOL RECORDS, WRITE:

POSTINDEX DIVISION ART METAL CONSTRUCTION COMPANY, JAMESTOWN, N. Y.

POSTINDEX

AD 234

ALL-STEEL EQUIPMENT INC.

Aurora, Illinois

SMARTLY-STYLED, RUGGEDLY-BUILT SCHOOL EQUIPMENT



PRINCIPAL'S DESK (above) TEACHER'S DESK (below) Convertible non-glare linoleum or vinyl tops. Interchangeable drawers. Self-lubricating nylon glides on drawers.





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AURORA ILLINOIS
ALL-STEEL EQUIPMENT INC.

School administrators everywhere are turning to ASE for *all* their school furniture and locker requirements. They know that ASE products will increase the efficiency of school operation, add smartness to school interiors . . . for years and years to come. A favorite feature with ASE users is convertibility—desks and tables can be converted to different functions to match your changing requirements. Write us for further information.



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ASE FILES AVAILABLE IN 3 COMPLETE PRICE RANGES

FILES. Available in a variety of styles and sizes. Rugged 6-post construction. Free-floating ball and roller bearing suspension cradle. Dawn Gray, ASE Green, Mist Green, Stylite Tan.



LIBRARY AND UTILITY TABLES. Tables for every use, ranging in size from 45" x 30" to 120" x 42". Convertibility feature. Durable linoleum tops. Bonderized finishes. Dawn Gray, ASE Green, Mist Green or Stylite Tan.



STORAGE CABINET. Ideal for classroom supplies, art materials, janitor's supplies, many others. Available in varied shelf and storage arrangements. ASE Green or Dawn Gray.



BOX AND MULTIPLE-TIER LOCKERS

LOCKERS. A style for your every need. Concealed hinges. Ample ventilation. Specially-designed ASE locker handle operates smoothly, easily. Pre-locking feature. In Dawn Gray and ASE Green.



No. 810 UTILITY CHAIR. Designed for all-day comfort. Foam rubber seat. Upholstery—Claremont, Gros Point or Naugahyde. Finishes —Dawn Gray, Stylite Tan, Mist Green, Brown and ASE Green.



No. 830 EXECUTIVE'S CHAIR. A truly outstanding chair. Precision manufactured. Luxuriously cushioned in thick foam rubber. Upholstery—Claremont, Gros Point or Naugahyde. Finishes — Dawn Gray, Stylite Tan, Mist Green, Brown and ASE Green.

ASE ALL-STEEL EQUIPMENT INC., *Aurora, Illinois*

DIEBOLD, INC.

Mulberry Road, Dept. AS-1, Canton 2, Ohio

Diebold offers schools record systems

Here are a few of the models of equipment that make up the Diebold Systems and protection lines used by the most progressive schools everywhere.

For complete data call your Diebold Man or write..., Diebold, Inc., Canton 2, Ohio



Cardineer Rotary Card Files

Master Cardineer

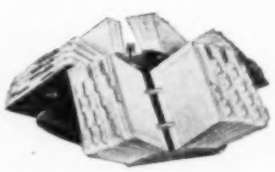
Only Diebold can give you Cardineer! This model available in both hand and motor operated types. Accommodates cards 8" x 5". A turn of the rotor brings 5,500 records per unit to the operator for convenient desk high posting and reference.

The Master Cardineer is the only rotary file offering these facilities . . . (1) removable segments to divide work . . . (2) three edges of cards exposed for guiding and flashing . . . (3) open rotor sides for offsetting . . . (4) desk top or direct rotor posting optional . . . (5) segments for holding double rows of cards . . . (6) 30" of cards visible at all times.



Desk Model Cardineer

Choice of two models. Single rotor capacity 1,500 records. Double rotor capacity 3,000 records—both for any size card up to 6" x 4".

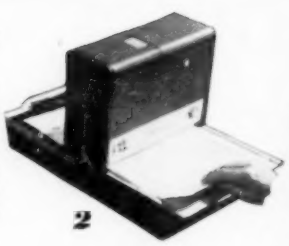


Desk Model Cardineer (Large)

This model revolves in a horizontal plane. The three card holding sections are removable for division of work. Capacity: 2,500 cards. Accommodates sizes 6" x 3½" to 8" x 8" or 9" x 5½".

Flofilm—*The complete microfilming process*

DUPLEX CAMERA — The Flofilm Model 9003 Camera (1) will microfilm copy up to 14" in width on either 16 or 35 mm film, one side or both sides simultaneously, up to 150 feet of copy per minute. Convenient low level feeding and eye level delivery of photographed documents. Automatic feed available. Electric eye trip to eliminate jamming of copy, an accurate film counter, and uncomplicated controls which an inexperienced person can operate. Of all-metal, lifetime construction.



2



3



1

PORTABLE CAMERA — This camera (2) weighs 20 pounds, will set on any desk, and can be operated by anyone. Fully motorized, it has an 11" throat, and microfilms faster than any operator can feed documents into it. Has magazine film loading which can be done in daylight; a partially-used film magazine can be removed and reinserted later for "split run" photographing. Small, compact, foolproof, amazingly inexpensive. Microfilms on 16 mm film any document, tissue to cardboard, at 24x reduction.

UNIVERSAL READER — The flofilm Universal (3) is the world's finest microfilm reader. Motorized film advance; all controls and film spools within fingertip reach of operator; inbuilt "Slo-flo" which automatically flows images across the screen at any speed chosen by operator. Image can be completely inverted by operator without moving from reading position. Enlargement ratios from 18 through 36x with one lens. Fingertip focusing. Handles any type 16 or 35 mm microfilm—plain, perforated, in strips or mounted, and makes paper photo enlargements of any image.

complete and protection

Diebold RECORD-HANDLING Systems

ROTARY VERTICAL VISIBLE MICROFILM

MICROFILM • ROTARY, VERTICAL AND VISIBLE FILING EQUIPMENT • SAFES, CHESTS AND VAULT DOORS • BANK VAULT EQUIPMENT • BURGLAR ALARMS

Fire Resistive Safes



Diebold's reputation has been built on record protection equipment. Tested by Underwriters' Laboratories for endurance in 1, 2 and 4 hour fires, plus drop and explosion tests. Any arrangement of safe interiors can be provided.



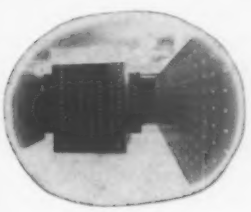
File Storage Room and Book Vault Doors

File Storage Room doors carry fire ratings of ½ hour and 1 hour. Book Vault doors are rated at 2, 4 and 6 hour fire endurance. All doors bear Underwriters' Laboratories labels and are equipped with relocking and unlocking safety features.



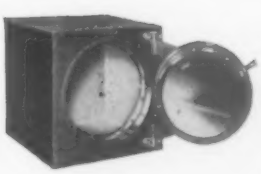
Tra-Dex Vertical Visible Files

Adds visibility to vertically filed records for speedy glance finding and faster processing. Makes visual checking and control possible by exposing columns of entries. Visible margins can be ½" to 3" wide. Available in portable sections and large capacity manifold styles for cards up to 12" high in any width.



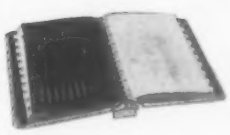
Safe-T-Stak Steel Storage Files

Reduce storage space requirements up to 40%. Can be interlocked vertically, side-by-side, and back-to-back for maximum safety. Fully loaded drawers open easily, even when stacked ceiling high.



Cashgard Chests

Eliminate burglary and hold-up hazards. Protect your funds in a Diebold Cashgard Chest. Reduced burglary insurance premiums will soon repay the full cost.



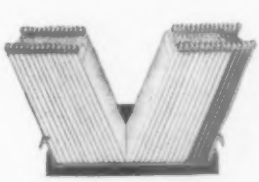
Flex-Site Loose-Leaf Visible Binders

Models and sizes taking up to a thousand or more records per unit. Form sizes from 2⅜" x 7½" to 15½" x 18" or larger. Especially applicable when flexibility, portability, compactness, low cost and easy fire protection are important factors.



Multi-Flex

To extend the advantages of individual Flex-Site units (described above) to larger installations. All necessary operations are performed without removing the individual Flex-Site units. 10,000 records easily housed in this manner.



V-Line Posting Trays

Automatic "V" eliminates "getting ready to post" operations . . . reduce "machine waiting time" between postings...increase overall record production. Adaptable to any form up to 17" x 14" on bond, ledger or index bristol.

THE GLOBE-WERNICKE CO.

Cincinnati 12, Ohio

Engineering Specialists in Office Equipment, Systems and Visible Records

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All the facilities of educational institutions are being burdened to the utmost, and administrative work is correspondingly heavy. Only the highest efficiency can bring some measure of relief to this situation. Globe-Wernicke furniture, equipment and systems are serving the pressing and often abnormal needs of countless institutions. These products are widely known for their excellent appearance, their enduring quality, their efficient performance and their practical economy.

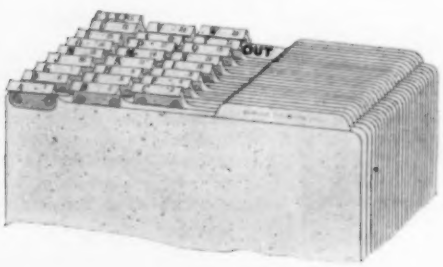
For more than seventy years Globe-Wernicke has maintained leadership in engineering and design, skilled craftsmanship, and manufacturing standards. Only a few of the 4000 products in the Globe-Wernicke line are shown here. Detailed information will be given promptly on request. See address above.

STREAMLINER METAL DESKS

These new desks have improved features of design which are especially valuable in institutional service. The tops, either square or molded edges, are interchangeable. Also, the pedestals are interchangeable. This provides a functional flexibility that is of greatest practical utility, since any Streamliner Desk can be individually fitted to its particular user and task. Drawers and slides operate easily and silently. Sturdy metal construction. Streamliner Tables are in matching design and colors. Finishes: gray, green, sea green, copper tan, and grained mahogany and walnut. Ask for circular showing range of models.



SAFEGUARD FILING SYSTEM



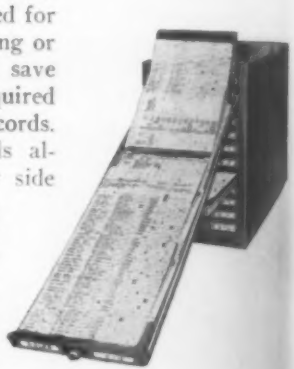
Utmost in simplicity, completely adaptable to every filing requirement and to any desired indexing method. Fast, accurate filing and finding by novice or expert. Readily expandable to any needed capacity. Write for Safeguard Filing System circular.

"7000 LINE" METAL FILES WITH TRIGGER LATCH



Sturdy, smooth operating, distinguished appearance. 2, 3, 4, and 5 drawer models—letter and legal size. Also available in wide range of insert drawers for documents, checks, cards, etc. Drawers glide smoothly, quietly on ball-bearing progressive suspension slides. Positive locking action easily released by trigger latch in handle. Lifetime baked on finishes in gray, green, sea green, copper tan; grained walnut or mahogany. Circular on request.

METAL VISIBLE RECORD EQUIPMENT



Globe-Wernicke Visible Record Systems are unmatched for speed and ease of removing or inserting record cards; save over 50% of the time required to find and refile card records. Completely flexible—cards always lie flat with either side accessible—two visible margins for indexing and signals. Cabinets for all standard card sizes; trays operate smoothly; also available in fire-safe construction. Finishes: green, gray, sea green, copper tan, grained walnut or mahogany.

ALL TYPES OF STOCK AND SPECIAL FORMS

The extensive use of Globe-Wernicke Visible Records has resulted in the collection of a tremendous variety of stock forms, available to users. Our Records Engineers will design and furnish special forms for any specified need.

THE GLOBE-WERNICKE CO.

Globe-Wernicke Metal TECHNIPLAN Modular Office Equipment

Handsome, modern offices arranged in any desired grouping or combination with interchangeable, interlocking Techniplan units —the original engineered modular office equipment. Improved comfort and working facilities, with saving of floor space, individually adjusted to any type of office task. Interlocking or free-standing partitions provide privacy, reduction of noise and distractions. Write for illustrated catalog.





STANDARD METAL BOOKSTACKS (Snead System)



GLOBE-WERNICKE METAL SECTIONAL BOOKCASES

Silent, receding glass doors afford full visibility, with modern styling. Globe-Wernicke sectional bookcases provide complete flexibility, unlimited capacity and ready adaptability to available space. Finishes: gray, green, sea green, copper tan, and grained mahogany and walnut. Circular free on request.



Globe-Wernicke Library Equipment (Snead) includes free-standing as well as built-in stacks, installed to architect's or user's specifications. Equipment for compact storage, automatic conveyors, aisle lighting, and study carrels, described in new catalog, sent on request. Write Contract Department, The Globe-Wernicke Co., Cincinnati 12, Ohio.

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Easier to teach—and easier for students to learn—because Underwood electric and standard typewriters stress simplicity of design and operation, are rugged and dependable in performance, preferred by business educators throughout the world.

UNDERWOOD ELECTRIC typewriters are easy on the typist, amazingly fast and accurate . . . a "natural" for quantity typing with a minimum of effort. Ask your local representative for a demonstration in your school.

UNDERWOOD 150 A pace-setter among new standard typewriters. Diamond-Set margins and color-controlled keyboard help make the "150" ideal for beginners *and* professionals.





UNDERWOOD PORTABLE TYPEWRITERS
Here is the new Underwood Universal, for the student who takes pride in neatly typed term papers, reports, and personal correspondence . . . an educational helpmate in every sense.

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You can *rely* on Underwood ribbons, carbon papers, stencils, and countless other office supplies to increase the speed and efficiency of your business operations.



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...and for school administration



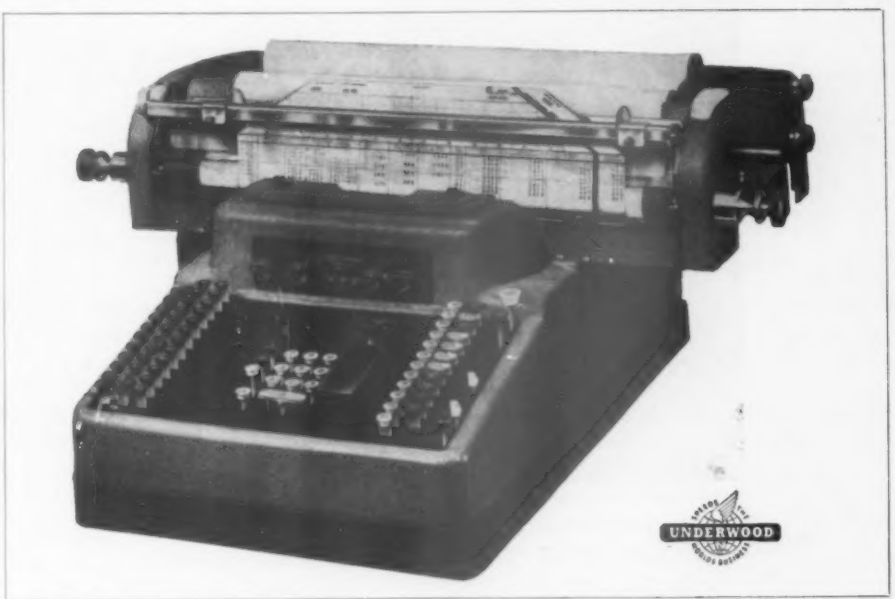
THE QUIET ADDING MACHINE
This Underwood Sundstrand has the simple 10-key keyboard, "muffled" action, and is *up to twenty per cent faster*. With Multi-flex Control, it will speed and simplify *your* figure-facts.



THE PRINTING CALCULATOR
by Underwood Sundstrand, is really *two machines in one*—a calculator that prints, and a general purpose adding-figuring machine. Learn how it applies to *your* office needs.

UNDERWOOD SUNDSTRAND Accounting Machines are used by numerous school systems throughout the world for budgetary accounting, students accounts receivable, accounts payable and payroll.

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ONE PARK AVENUE NEW YORK 16, N. Y.

• TYPEWRITERS • ADDING MACHINES • ACCOUNTING MACHINES • OFFICE SUPPLIES

THE NATIONAL CASH REGISTER COMPANY

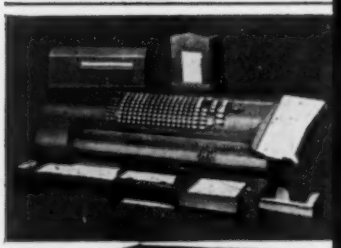
Dayton 9, Ohio



A *National* System

saves more than it costs!

NATIONAL CLASS 31 ACCOUNTING MACHINE handles payroll, accounts payable, analysis, general ledger, and other accounting and billing work! On some jobs, 2/3 of the work is done automatically . . . and what the machine does automatically the operator cannot do wrong.



NATIONAL CLASS 2000 PAYROLL AND DISTRIBUTION MACHINE has the new Automatic Multiple Tax Computor, electric tax control, and automatic media handling devices! Posts 5 records simultaneously . . . posts and proves daily payroll accrual and distribution of labor in one operation . . . posts individual bond records . . . simplifies distribution . . . speeds work and promotes accuracy.



NATIONAL CLASS 6000 CASH REGISTER promotes accuracy by "publicizing" the prices charged . . . provides mechanically accurate addition . . . maintains customer confidence . . . speeds service and saves valuable time . . . records and totals tax . . . protects cash . . . *all* as a by-product of recording the sale!



NATIONAL ADDING MACHINE is the only adding machine that has all 8 basic time-and-money-saving features combined on one machine—features that save hundreds of motions every hour the machine is used. Departmental managers all over the country know from experience the many operating advantages and automatic features of the National Adding Machine.



NCR SUPPLIES save time, promote accuracy, speed service and give you up-to-date records when you want them. They include balance forms, files, ink ribbons, inventory forms, money bags, paper rolls, paid-out vouchers, profit and loss statements, received-on-account slips, register reading reports, sales books, salespersons' cash reports, statement books and sales sheets.

There are models for every size and type operation. The *complete* National System can be adapted to your individual needs. In operations of all types and sizes it saves *more* than it costs. How much will it save *you*—and how quickly? Let your nearby National representative—a trained systems analyst—show you.

***THE NATIONAL CASH REGISTER COMPANY,* Dayton 9, Ohio**

National
CASH REGISTERS · ADDING MACHINES
ACCOUNTING MACHINES

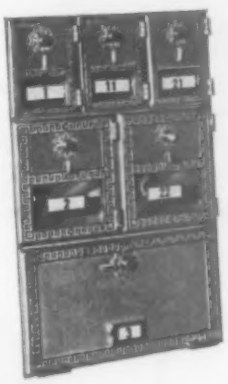
FEDERAL EQUIPMENT COMPANY

Carlisle, Pennsylvania

EQUIPMENT for DISTRIBUTION of STUDENT MAIL

Bag Racks
Combination Lock Boxes
Cases, Combination Cases and Work Tables
Seats and Work Tables

For 47 years Federal has been working with the Post Office Department, colleges, hospitals and business houses to plan efficient mail handling facilities. Highest quality products have given the Federal Equipment Company a reputation as THE manufacturer of the best built post office equipment. We have tried to uphold that reputation in all that we do. Our experience and staff are available to you upon receipt of your inquiry. Send the following information to us for a complete plan: Number of boxes of each size needed and overall sizes of room.







COMBINATION MAILING CASE AND TABLE

The peak in versatility. Equipped with sorting case, stamping table, pigskin stamp pad, and bag rack. This is a one unit answer to the needs of many mail rooms. Strongly constructed for heavy use.

COMBINATION LOCK BOXES

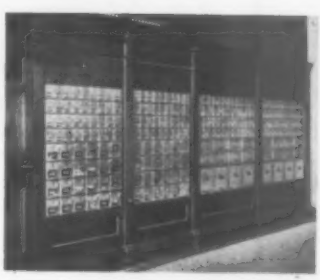
Time Saving—Money Saving—Secure—Minimize mail handling costs; reduce misrouting of mail; eliminate theft by the use of Federal Automatic Combination Lock Boxes. This is the preferred way of handling mail. Tamper-proof combination lock in heavy bronze door does away with "lost key" worries and key file systems.
Identical Box used by U. S. Post Office Dept.

Federal No.	Outside Dimensions		Inside Dimensions		
	Height (A)	Width (B)	Height	Width	Depth
1	5"	3 2/3"	4 1/2"	3 3/16"	14"
2	6 1/4"	5 1/2"	5 3/4"	5"	14"
3	6 1/4"	11"	5 3/4"	10 1/2"	14"

FLAT PAPER CASE



Primarily used for sorting newspapers and magazines but can be used for a variety of large and small articles. Handy for college alumni magazines and mailings. If "slugs" are a problem this is the case you need. The cases illustrated are only two of a complete line of mail handling cases and tables.

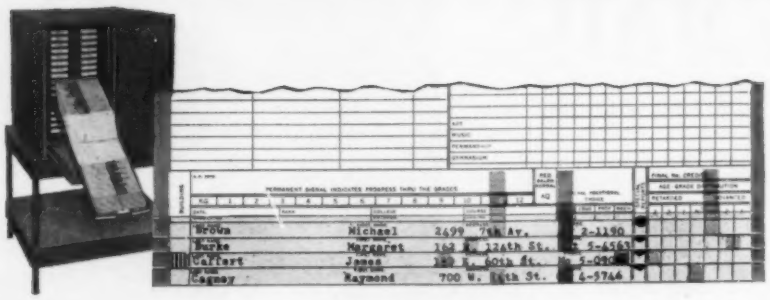


The cast bronze door is fitted to a continuous bronze frame. Finish is a bright natural bronze. The "throw-off" device disturbs the combination as soon as the door is opened. It is impossible to leave the box unlocked. The combination is easy to operate, yet very secure.

Write for Descriptive Catalog of Entire FEDERAL Line

REMINGTON RAND INC.

315 FOURTH AVENUE, NEW YORK 10, N.Y.



Kardex puts facts at your fingertips. Completely centralizes your records. Saves time by selecting items requiring immediate attention. Widely used for: Pupil History, Guidance and Attendance; Purchase and Stock; Budget, Health, Financial and Textbook Records.



Single-unit Transcopy Duplex exposes, develops and prints photocopies in *seconds!* Portable, easy to operate, plugs into any socket. 100% accurate. Eliminates running water.



The "99" Printing Calculator provides fully *automatic* figurework performance including credit balances and new, exclusive Simpla-tape, for printed proof of accuracy.



Remington Rand All-Electric Adding Machine, 10-Key Touch Method operation. Perfect for teaching or office work. Cushioned power minimizes noise and vibration.



Remington Dexigraph produces up to 300 transcripts per hour. Copies same size or reductions down to 50%. Requires no plumbing, no special wiring. Can be moved room to room.



Remington Electric Typewriter Business Education Advancement Plan enables you to purchase famous Remington Electric Typewriters at lowest cost in history. Write today.



New Tested Tempo Touch Super-Riter, ideal for classroom teaching. Has new Perfect Positioning Scale for easier margin setting. New, built-in "touch" for fast, rhythmic typing.



Multi-Matic cuts payroll time in *half!* One writing gives you: 1. Employees Pay Statement, 2. Earnings History Record, 3. Payroll Record. No chance for transcription errors!

A complete line of Remington Rand Business machines, equipment and supplies is available for your school office, classroom or library. Whatever your need you'll find it doesn't cost – but pays to give us the responsibility for your installations. For complete information call your local Remington Rand office, or write Remington Rand, Room 1976, 315 Fourth Avenue, New York 10, New York.



Library Bureau Cases of Distinction have new "Fluid" lighting system that gives shadowless light. Dust and vermin proof. Table and upright models—lighted and unlighted.



Trend Library Furniture assures lasting beauty. Combines flush construction and rounded corners to eliminate dust, reduce splintering. Refurnishing or expanding, select Trend – the library furniture with the smart, modern look. Write for free booklets "TREND" and "PLANNING THE SCHOOL LIBRARY."



Aristocrat Lifetime Files. 3-drawer Aristocrat files with continuous linoleum tops, banded with metal edges, offer your office step-saving efficiency plus lifetime beauty.



Certified Safe-Files protect your valuable records. Files certified safe from heat of 1700°F. for at least one hour. Available for housing all card, letter or legal-size records.



Certified Safe-Cabinets. Certified for one, two or four hours against fire. Available with adjustable equipment for card index drawers, file drawers, document files and shelves.



Cost-cutting Supplies for Office and Classroom. Remington Rand Patrician Ribbon, made of imported cotton, ⅓ longer. Line-a-time holds copy at correct angle, prevents errors. Beautyrite Carbon Paper assures crystal-clear carbons. Procel Stencils, with plastic coating, ideal for illustration and form work. Use Remington Rand Supplies and note how you save.

Remington Rand Inc.

315 FOURTH AVENUE—NEW YORK 10, N.Y.

THE MOSLER SAFE COMPANY

Dept. A. S., 32nd Street and 5th Ave., New York 1, N. Y.



How Much Protection does a Student's "Past" Deserve?

When you consider that the key to every student's *future* is the "past" indicated on his scholastic records, protection of those records becomes mighty *important*, doesn't it? Important enough to make you think *twice* about keeping them in ordinary metal files, or an old safe—both of which can *incinerate* records if fire starts. Yes, even if your building is fireproof!

Don't risk the confusion that would result, and the damage which might be done to so many young careers—if this *happened*. Get the world's best fire-resistive protection for your scholastic and administrative records, now. Write or wire Dep't A. S., *The Mosler Safe Company, 32nd Street and 5th Ave., New York 1, N. Y.* Get details on the Mosler units below and the many others available.



New Mosler Record Safe. The famous "400" Series "A" Label Safe that provides the world's *best* protection for records. Attractive. Modern. Provides 4-hour protection at severe 2,000° F. fire exposure.



New Mosler Vault Door. Carries independent Underwriters' Laboratories, Inc. label, providing up to 6 hours fire protection. Modern styling features exclusive "Counter Spy" lock, and attractive "operations panel."

IF IT'S MOSLER . . . IT'S SAFE

The **Mosler Safe** Company Since 1848



Mosler Fire-Resistive File. Especially handy and practical for school records. Fully insulated to provide Underwriters' approved protection against fire. Available in letter or legal width drawers, and 2, 3, or 4-drawer heights. May be used singly or in batteries with linoleum top.

World's largest builders of safes and bank vaults . . . Mosler built the U. S. Gold Storage Vaults at Fort Knox and the famous bank vaults that withstood the Atomic Bomb at Hiroshima

E FOOD SERVICE—HOMEMAKING—DORMITORY

a. Lunchroom

Schieber Sales Company	**E a/1**
Haldeman-Langford Manufacturing Co.	E 9
Rol-Fol Table, Inc.	E 10, 11
Boonton Molding Company	E 12
The International Silver Company	E 13
Corning Glass Works, Consumer Products Division	E 14, 15
Keyes Fibre Sales Corporation	E 16
United States Plywood Corporation	E 31

b. Kitchen

Anetsberger Brothers, Inc.	**E b/1**
Colt's Manufacturing Company	**E b/2**
National Cornice Works	**E b/3**
Market Forge Company	**E b/4**
G. S. Blakeslee & Co.	E 17
The Aluminum Cooking Utensil Company	E 18, 19
S. Blickman, Inc.	E 20
The Cleveland Range Co.	E 21
The Colson Corporation	E 22
Crescent Metal Products, Inc.	E 23
Gifford-Wood Co.	E 24
Puffer-Hubbard Refrigerator Company	E 25
Sedgwick Machine Works	E 26
Toledo Scale Company	E 27
The Triumph Manufacturing Company	E 28
Universal Dishwashing Machinery Co.	E 29
Universal Industries	E 30
The John Van Range Co.	E 32

c. Homemaking Laboratory

General Electric Co., Appliance & Merchandise Dept.	**E c/1**
Mutschler Brothers Company	**E c/2**
Wood-Metal Industries, Inc.	**E c/3**
Singer Sewing Machine Co.	E 33

d. Residence Hall

Simmons Company	E 34, 35
Superior Sleeprite Corp.	E 36, 37
Jamestown-Sterling Corporation	E 38
Carrom Industries, Inc.	E 39

for Schools
Industrial Plants
Community Houses
Institutions, etc.

Schieber

FOLDING TABLES AND BENCHES

Patents: 213165 and 2203394. Other patents applied for.

Create space by making an area double as lunchroom

Multi-purpose area proves practical approach to reduced building costs

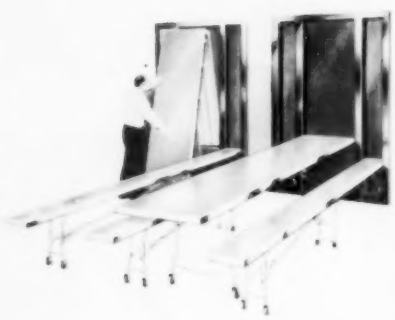
In many types of structures, public and parochial schools, industrial plants, community houses and institutions, it is necessary to provide lunchroom facilities. It has been proved unnecessary, however, to provide a costly area exclusively for the purpose.

The development of sturdy, serviceable folding tables and benches by Schieber has offered a practical means of converting an activities area, in a matter of minutes, into a lunchroom and just as quickly restoring it to its original use.

From coast to coast, thousands of Schieber units are in daily use. In design, the emphasis has been on simplicity of operation—in construction, on quality. Never has there been a service problem on a Schieber installation and the first unit ever built (1937) is still in daily operation with many more years of useful life indicated.

As well as providing models for new construction, Schieber has models for converting space to multi-purpose use in existing structures. This can be done at low cost or no cost, depending on the type equipment wanted.

Three types of folding equipment



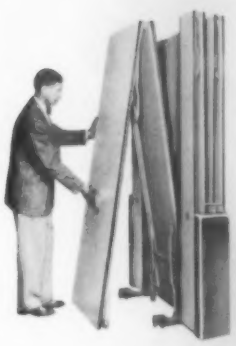
SCHIEBER *In-wall*

Original Schieber model and still most specified. Rigidly attached to wall. All-steel welded construction, sanitary composition top surfaces. Oilless bearing casters. Fully described on pages 3 and 4.



SCHIEBER *Port-a-Fold*

Can be used attached to wall or rolled to any location. Welded steel understructure, ¾" Philippine Mahogany plywood tops with sanitary plastic surfaces. Fully described on pages 5 and 6.



SCHIEBER *Mobil-Fold*

Two Port-A-Fold type table and bench units fold into caster equipped truck. When not in use, can be rolled against wall or to storage area. Fully described on pages 7 and 8.

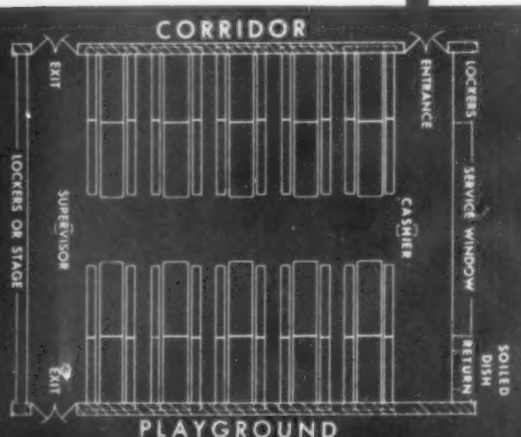


Diagram at left demonstrates how lunchroom seating provisions for 200 can be provided in a space that would normally require 20% more space. The 10 Schieber units indicated here can be rolled from the wall pocket in ten minutes and returned as quickly by one person.

SCHIEBER SALES COMPANY, Brightmoor St

SCHIEBER *In-wall*



FOR NEW CONSTRUCTION
In the Wall

Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Installs flush with wall. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only. See specifications.



FOR LOW COST REMODELING
Against the Wall

Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Anchors to wall, protrudes only seven inches. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only. See specifications.

Thousands of these Schieber In-Wall units are now in use. There are installations in practically every state and several foreign countries. Complete counterbalancing makes this heavy, strong, all-steel welded unit easily manageable. This model was first in the line and is still first preference. Note table and benches are not attached to each other and free access is afforded from the end. All edges are trimmed with stainless steel. Pockets are steel with full steel backs.





See complete specifications on next page.



This space serves double duty as gymnasium and lunchroom. Conversion takes less than ten minutes and is a one-man job.

1. Substantial welded steel construction
2. Heavy, sanitary linoleum on top surfaces
3. Stainless steel trim on tables and benches
4. Mark-proof, silless bearing rubber casters
5. Fire-proof construction in every detail
6. Counterbalanced for easy roll-out and return



DETROIT 23, MICHIGAN

Schieber *In-wall* Specifications

This heading covers the furnishing of In-Wall two leaf folding tables and benches, manufactured by Schieber Manufacturing Co., Detroit 23, Michigan.

Connected to and extending from steel pockets, as shown in the plans, they shall be approximately 14 feet long when extended. They shall be provided with automatic and manually operated locks and shall be flush with the pockets' face when locked in the pockets.

POCKETS—Supplied by Schieber Sales Company as part of unit. All pockets shall be of No. 16 gauge steel and shall be spaced approximately 6′ 6″ center to center or as shown in plans.

For in-the-wall models the pockets shall be approximately 7′ 4″ high and 4′ 9½″ wide and 7/16″ deep including stiffening bars. Pockets for this model shall have ⅛″ x 3″ facing to overlap wall and have 3/16″ x 1″ x 6″ long anchors on approximately 2′ 3″ O.C. welded to pocket sides and 3″ x 3″ x ¼″ x 5′ 9½″ angle iron lintel welded to pocket top and extending approximately 6″ each side of pocket, and two anchor bars ⅜″ x 1½″ extending 2″ each side of pocket.

For against-the-wall model the pocket shall be approximately 7′ 7″ high, 5′ 2⅜″ wide. Pockets for this model shall be of the cabinet type with well rounded corners on front top and front sides.

TABLES—Construction shall by No. 20 gauge sheet steel welded to 1½″ x 1½″ x 3 16″ angle iron frames, covered with ⅛″ thick linoleum and shall have an automatically operated hinged leg with oilless bronze bearing rubber wheel terminals secured to the outer frame and a strut member secured to the inner frame.

Hinged leg shall be tubular 1 1/16″ O.D. with ⅛″ wall thickness.

BENCHES—Construction shall be of No. 16 gauge sheet steel formed frames, covered with ⅛″ thick linoleum and shall have an automatically operated hinged leg with oilless bronze bearing rubber wheel terminals secured to the outer frame and an automatically operated hinged leg with rubber bases and a strut member secured to the inner frame. Hinged legs shall be tubular 27/32″ O.D. with ⅛″ wall thickness.

The edges of table and benches to be trimmed with stainless steel.

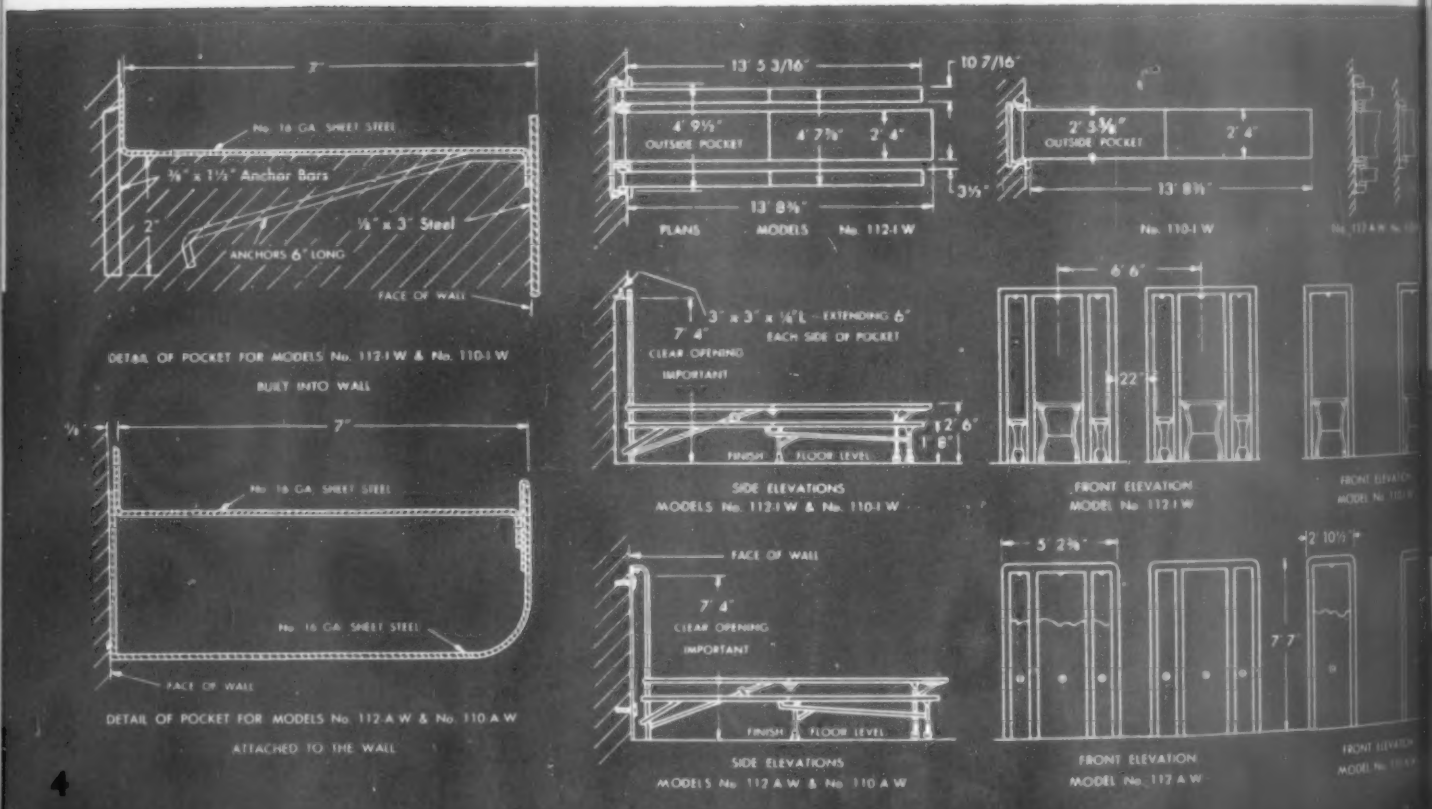
PAINT—Pockets of all models to receive one coat of red lead before shipment with finish coat by general contractor or purchaser at his expense. The understructure of tables and benches of all models to be painted aluminum by the manufacturer.

INSTALLATION—Pockets for the in-the-wall models shall be built into the walls by the building contractor at his expense. Pockets for against-the-wall models shall be attached to the walls by the Purchaser at his expense. Tables and benches shall be installed by Table Contractor under terms and conditions noted in quotation.

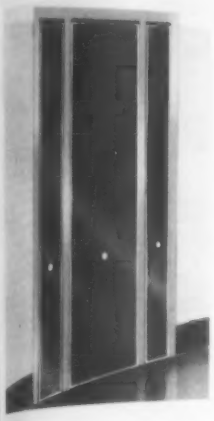
Pocket installation of all models to comply with manufacturer's recommendations.

In-Wall units are standard in 30″ high tables with 20″ benches and 25″ tables with 15″ benches.

Model	In-the-wall tables and benches	Against-the-wall tables and benches	In-the-wall table only	Against-the-wall table only
In-Wall	**112—IW**	**112—AW**	**110—IW**	**110—AW**



SCHIEBER *Port-a-Fold*



FOR NEW CONSTRUCTION
In the Wall

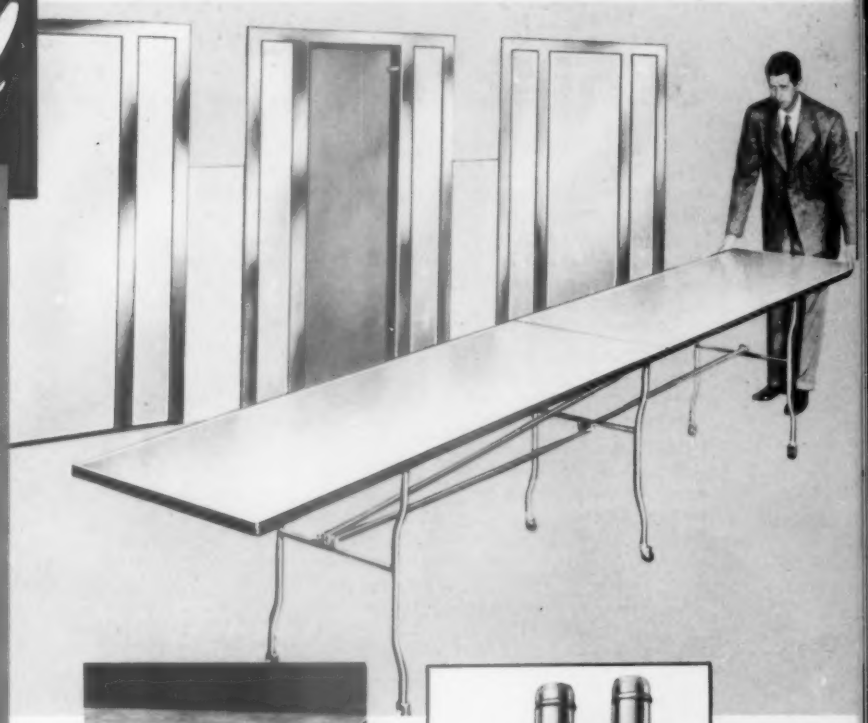
Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Installs flush with wall. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only. See specifications.

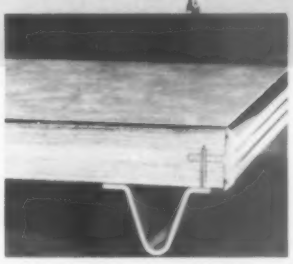


FOR LOW COST REMODELING
Against the Wall

Consists of folding table and 2 benches. Seating capacity: 16 adults or 20 children. Anchors to wall, protrudes only seven inches. Locks in folded position without danger of dropping. Removable key makes it tamper-proof. Also available as table unit only. See specifications.

This model is distinguished by its low cost and its flexibility. It may be left attached to the wall pocket while in use or tables and benches may be readily detached and rolled to any position for banquet or other use. Understructure is welded steel tube. Table and bench tops are ¾" Philippine Mahogany with attractive plastic surfaces. All edges are stainless steel trimmed. Pockets are steel with full steel backs.





Cross section shows formed steel reinforcing member. Run full length of table for extra rigidity and support. Note high pressure laminated, heat resistant plastic surface.



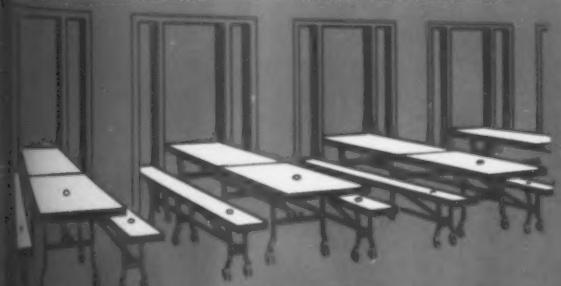
Straight shank, non-swivel casters on end legs, swivel casters in center give units stability and permit steering when rolled.



Tracks are welded on Port-A-Fold pockets and retractible studs on tables and benches have roller heads that lock into tracks. They can not slip out when operated.



All Port-A-Fold hinges and brackets are stamped from heavy gauge steel. No castings are used to endanger those operating the equipment.



Folded down but left attached to wall for quick return after lunch hour.



Rolled from wall where room layout necessitates or for special use.

See complete specifications on next page.

Schieber *Port-a-Fold* Specifications

This heading covers the furnishing of Port-A-Fold two leaf folding tables and benches, manufactured by Schieber Manufacturing Co., Detroit 23, Michigan.

Connected to and operating from steel pockets, as shown in the plans, they shall be approximately 14 feet long when extended. They shall be provided with automatically and manually operated locks and shall be flush with the pockets' face when locked in their pockets.

DETACHABLE—The extended tables and benches shall be constructed to permit detachment from the pocket by a manually operated lock so that they may be rolled about the room as desired.

POCKETS—Supplied by Schieber Sales Co. as part of unit. All pockets shall be made of No. 16 gauge steel and shall be spaced approximately 6'6" center to center or as shown in plans.

For in-the-wall models the pockets shall be approximately 7' 1⅝" high and 4' 8⅝" wide and 7/16" deep including stiffening bars. The pockets for this model shall have ⅛" x 3" facing to overlap wall, 3/16" x 1" x 6" long anchors approximately 2' 3" O.C. welded to pocket sides, 3" x 3" x ¼" x 5' 8⅝" angle iron lintel welded to pocket top and extending approximately 6" each side of pocket and two anchor bars ⅜" x 1½" extending 2" each side of pocket.

For against-the-wall models the pocket shall be approximately 7' 4⅝" high, 5' 1½" wide. Pockets for this model shall be of the cabinet type with well rounded corners on front top and front sides.

TABLES—Construction shall be of ¾" Philippine Mahogany plywood covered with high pressure, laminated, heat-resistant plastic with backer sheet and shall have automatically operated hinged legs with rubber wheel terminals secured to center and ends of each section. Legs shall be tubular 1 1/16" O.D. with ⅛" wall thickness.

"V" formed stiffening bars support entire length of table top. Plastic surfaces available in 5 standard colors. Special colors available at extra charge.

BENCHES—Construction shall be of ¾" Philippine Mahogany plywood covered with high pressure, laminated, heat-resistant plastic with backer sheet and shall have automatically operated hinged legs with rubber wheel terminals secured to center and ends of each section. Legs shall be tubular 27/32" O.D. with ⅛" wall thickness.

The edges of table and benches shall be trimmed with stainless steel moldings applied with no exposed fastening. Top edge of molding to cover joints between plastic top and core to provide a tight joint.

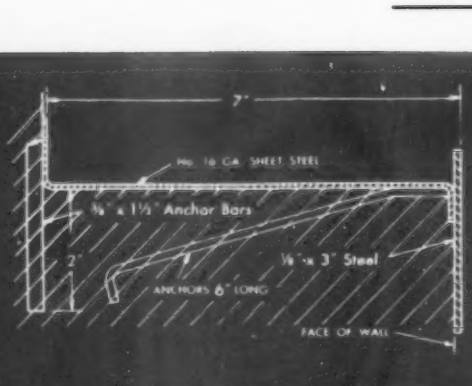
PAINT—Pockets of all models to receive one coat of red lead before shipment with finish coat by General Contractor or purchaser at his expense. The understructure of tables and benches of all models to be painted aluminum gray enamel by the manufacturer.

INSTALLATION—The pockets for the in-the-wall models shall be built into the walls by the building contractor at his expense. The pockets for against-the-wall models shall be attached to the walls by the purchaser at his expense. The tables and benches shall be installed by the general contractor or purchaser at his expense.

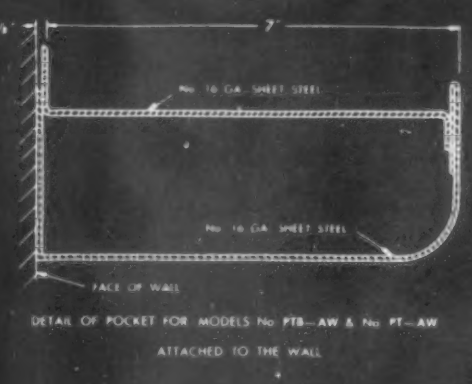
Pocket and table and bench installation of all models to comply with manufacturer's recommendations.

Port-A-Fold units are standard in *14 foot lengths*, 30" high tables with 20" benches and 25" tables with 15" benches. Other table heights in 1 inch increments from 24" to 30" may be specified at additional charge. Benches available for special sizes from 14" to 20" in 1 inch increments.

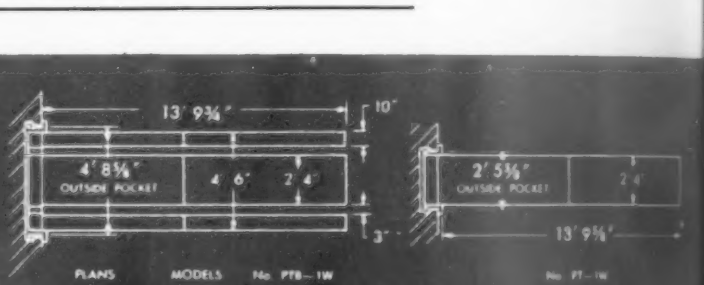
Model	In-the-wall tables and benches	Against-the-wall tables and benches	In-the-wall tables only	Against-the-wall tables only
Port-A-Fold	**PTB—IW**	**PTB—AW**	**PT—IW**	**PT—AW**

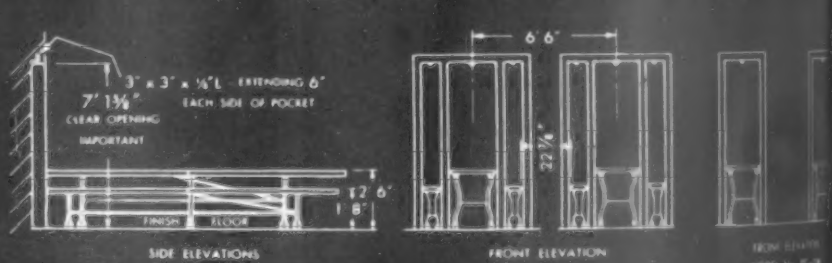


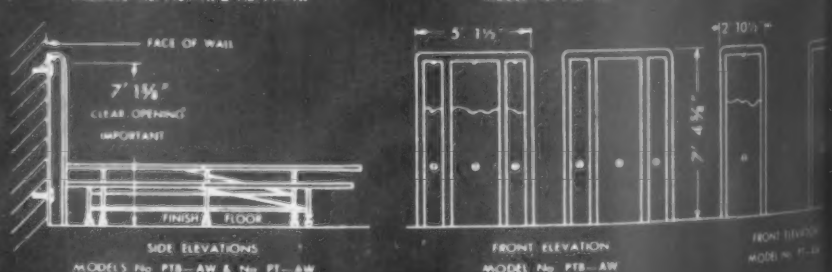
DETAIL OF POCKET FOR MODELS No. PTB—IW & No. PT—IW BUILT INTO WALL



DETAIL OF POCKET FOR MODELS No. PTB—AW & No. PT—AW ATTACHED TO THE WALL

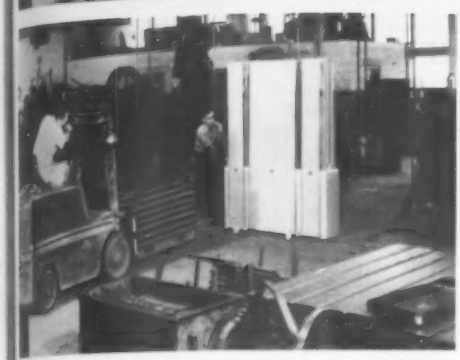






SCHIEBER *Mobil-Fold*

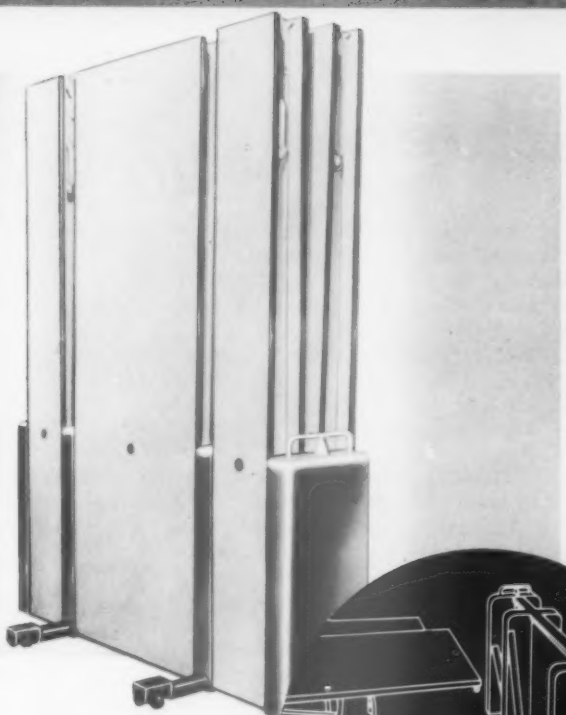


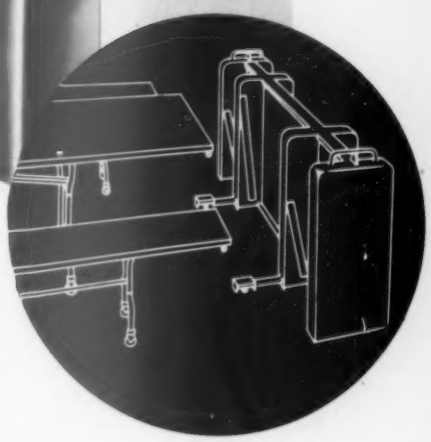


Mobil-Fold is the newest Schieber model. It is designed for use in buildings where complete flexibility is desired. No installation of pockets is required either in or against the wall. The mobile truck can be rolled out of the way against the wall, out in the corridor or to a specially provided storage area. The folded assembly is virtually tip-proof and can be pushed and steered by one person.









Tables and benches detach from the truck. Swivel casters on the center legs permit rolling to any position.

Two sets of tables and benches of the Port-A-Fold type fold up and lock into an all-steel truck equipped with casters.

Mobil-Fold units are available in 14 foot units which fold up in the truck to a height of 86″ and in 12 foot units which fold up in the truck to a height of 74″.



Two 14 foot tables of unit illustrated accommodate 32 adults or 40 children.

Tables of the 12 foot unit accommodate 28 adults or 36 children.

See complete specifications on next page.

Schieber *Mobil-Fold* Specifications

This heading covers the furnishings of MOBIL-FOLD tables and benches manufactured by Schieber Manufacturing Company, Detroit 23, Michigan.

Connected to and operating from a steel carrier, each unit shall consist of 2—12′ or 14′ folding tables and 4—12′ or 14′ folding benches. Each table and bench shall be provided with manually operated locks and shall be flush with the carrier's face when folded and locked in the carrier.

DETACHABLE—The extended tables and benches shall be constructed to permit detachment from the carrier by a manually operated lock so that they may be rolled about the room as desired.

CARRIER—Supplied by Schieber Sales Company as part of a unit. Carrier shall be made of 16-gauge steel properly reinforced with well-rounded corners on end panels and shall be approximately 33″ high, 61 ½″ wide and 14½″ over-all depth. When tables and benches are folded and locked in carrier the over-all height shall be approximately 7′ 2″ for 14′ and 6′ 2″ for 12′ models. Each carrier shall have 2 supporting leg members each side, protruding 6⅜″ from face of carrier. The ends of each supporting leg shall be equipped with a 2½″ rubber-tired caster to permit easy movability when tables and benches are folded and locked in carrier.

TABLES—Construction shall be of ¾″ Philippine Mahogany plywood covered with high pressure, laminated, heat-resistant plastic with backer sheet and shall have automatically operated hinged legs with rubber wheel terminals secured to center and ends of each section. Legs shall be tubular 1⅛″ O.D. with ⅛″ wall thickness.

"V" formed stiffening bars support entire length of table top. Plastic surfaces available in 5 standard colors. Special colors available at extra charge.

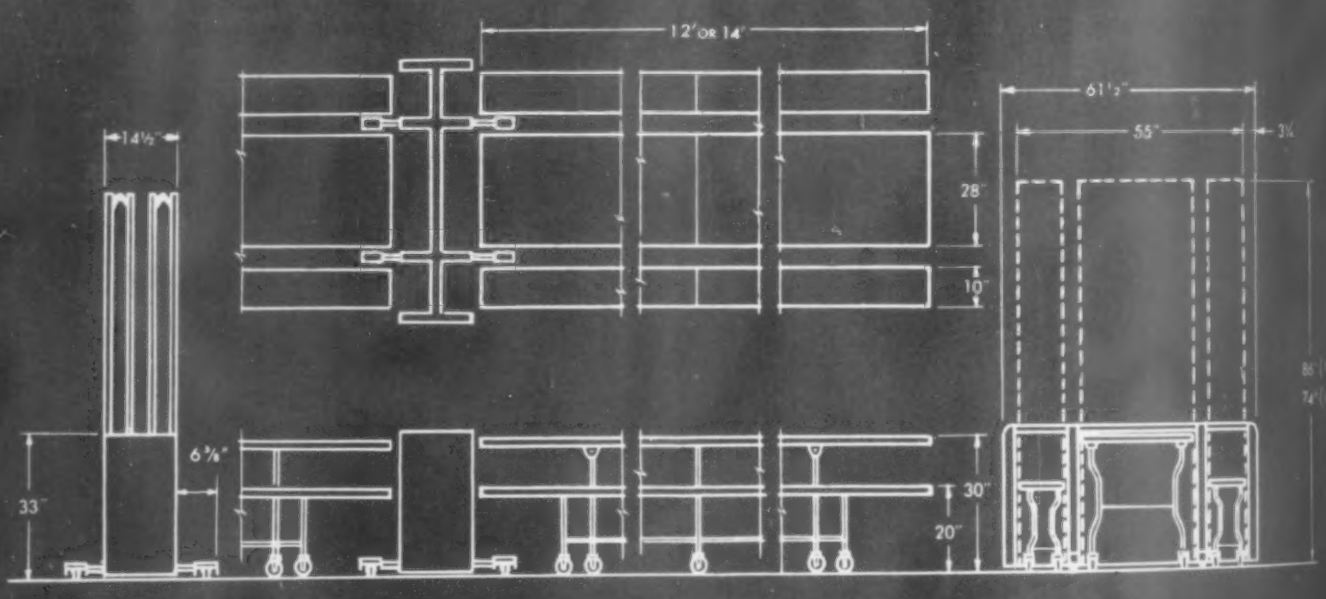
BENCHES—Construction shall be of ¾″ Philippine Mahogany plywood covered with high pressure, laminated, heat-resistant plastic with backer sheet and shall have automatically operated hinged legs with rubber wheel terminals secured to center and ends of each section. Legs shall be tubular ⅞″ O.D. with ⅛″ wall thickness.

The edges of table and benches shall be trimmed with stainless steel moldings applied with no exposed fastening. Top edge of molding to cover joints between plastic top and core to provide a tight joint.

PAINT—Carrier shall be finish painted with aluminum gray enamel. The understructure of the tables and benches to be painted aluminum gray enamel.

Mobil-Fold units are standard in 30″ high tables with 20″ benches and 25″ tables with 15″ benches. Other table heights in 1 inch increments from 24′ to 30″ may be specified at additional charge. Benches available for special sizes from 14″ to 20″ in 1 inch increments.

Litho in U.S.A.
Form 10M254



NOTE: Schieber Sales Co. reserves the privilege to make substitutions for the materials specified in this folder if for reasons beyond their control such material is not available and/or such substitutions tend to improve the product.

SALES OFFICES IN PRINCIPAL CITIES

SCHIEBER SALES COMPANY, Brightmoor Station, DETROIT 23, MICHIGAN

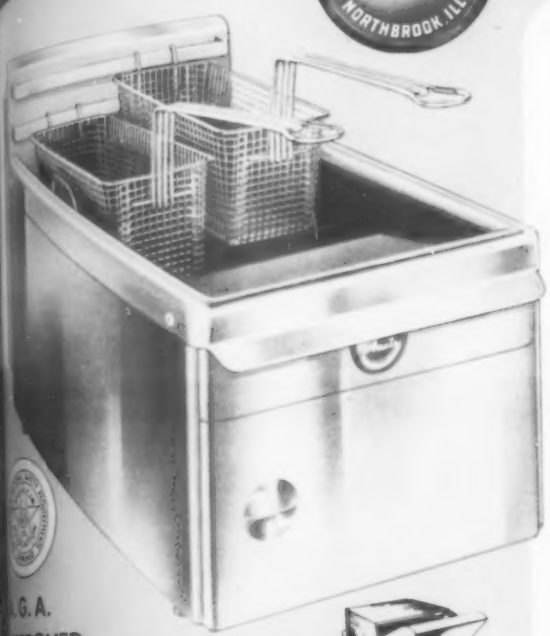
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COUNTER *Gas* EQUIPMENT

First CHOICE of LEADING OPERATORS for TASTIER FOODS SERVED FASTER

ANETSBERGER BROS. INC. Anets NORTHBROOK, ILLINOIS



A.G.A. APPROVED

COUNTER FILTER-FRYER FRIES OVER 30 LBS. of WEIGHED RAW POTATOES to FINISHED FRENCH FRIES IN AN HOUR.

Rounded corners and smooth inside of kettle make for easy cleaning, while the exclusive lift-out tray keeps the fat cleaner and clearer. Only takes up a space 13-7/8" wide by 23-5/8" deep. Welded steel radiants of kettle with enclosed combustion chamber steps up the efficiency and accellerates the frying speed. Only an Anets Counter Fryer gives you so many profit-making features.

Small, compact, streamlined design with sparkling stainless steel cabinet. Any small temperature drop in cold loading is quickly recovered to frying temperature. Uses only 12 lbs. of frying fat, yet is power-packed to produce more than many larger fryers. Large twin basket capacity. Write for Bulletin No. 210 for details

Model MCG-11" x 11" Fat. Cap. 12 lbs. Shipping wt. 70 lbs.

NEW COUNTER FOOD-WARMER KEEPS FOOD WARM AND APPETIZINGLY FRESH for FASTER SERVING at RIGHT TEMPERATURE

Keeps meats, vegetable, soups, gravies, stews and fried foods at correct selected temperatures for instant serving. Can be equipped with steam hood for serving hot dogs or a tray and pan to convert it into a roll freshener and warmer. See sketch "B". Stainless Steel Cabinet has insulated walls and door.

Top opening of 11-7/8" x 19-7/8" accomodates many standard stainless steel pan insert combinations. Temperature range from 140° to 200°. Compact space saving, only occupies space 13-5/8" wide x 23-5/8" deep. Matches Anets other counter units. Write for Bulletin No. 215.

Model FWS-2 B.T.U. Input 6,000. Shipping weight, 45 lbs.



ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

COUNTER HOT-PLATE

Performs a variety of fast operations. Has giant size burner with hi-lo and simmer valve, and standard size burner with hi and lo valve. Permanent pilot. Stainless cabinet. Aluminum splash pan and burners remove for easy cleaning. Special design grid holds coffee percolators and small frying pans, yet is strong enough to hold large stock kettles.

OVERALL SIZE: 10-3/8" wide x 24" deep x 9-3/8" high. Shpg. Wt. 35 lbs.



Anets

14" and 18" Filter-Fryers

SET NEW PRODUCTION RECORDS that are OUTSTANDING!

14 "Fries OVER 60 lbs. of WEIGHED RAW POTATOES to FINISHED FRENCH-FRIES PER HOUR!!

18 "Fries 75 lbs. of WEIGHED RAW POTATOES to FINISHED FRENCH-FRIES PER HOUR!!



WHAT THIS MEANS IN MORE MONEY TO YOU

Anets 14" and 18" Filter-Fryers give you round-the-clock production of tastier foods that are free from excess fat. No faltering, no temperature lag as they swiftly take care of your peak rush periods. They SAVE-SAVE enough on fat alone to soon pay for themselves. Call your Anets dealer. See them in operation and you'll known why they have become first choice for profit minded operators.

SO EASY-TO-CLEAN

...and KEEP CLEAN

No bags to empty—no muss—just lift-out the strainer tray and dump the crumbs to keep the fat cleaner and clearer even during the frying period. Simple, fast and sanitary. Only Anets Filter-Fryers offer you this exclusive sanitary feature.







ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

TEMPERATURE IS ALWAYS UP AND READY FOR THE NEXT COLD LOAD

A. G. A. APPROVED

MODEL FGS-18" FILTER FRYER for HEAVY DUTY PRODUCTION

This Anets 18" Filter Fryer uses only 60 lbs. of fat yet has large production shown above. Multiple steel radiants welded to bottom of kettle increase heating area, while the large ribbon burners swiftly recover the temperature drop so temperature is always up to frying speed. Smooth inside of kettle with lift-out crumb tray makes cleaning easy. New high precision thermostat. New welded wire basket. Write for Bulletin No. 213. Size 20-7/8" wide, 31" deep, B.T.U. input 84,000. Shipping weight, 210 lbs.

MODEL FGS-14" x 14" FILTER FRYER a BIG PROFIT

Famous for faster frying speed and flash recovery in heavy loading. Saves-Saves on fat. Six FGS-14" fryers replacing units saved 240lbs. of fat a week and turned out a greater tion of tastier food in less time. Easier to clean too, with side of kettle and lift-out tray to remove crumbs keeping fat and clearer. Uses only 32 lbs. of fat. Write for Bulletin Overall size; 16-7/8" wide 25-3/8" deep. Shipping wt.

THERMOSTATICALLY CONTROLLED . . .

Amets GRILLATOR

Operators with LITTLE OR NO EXPERIENCE can FRY the THICKEST STEAKS or BIG ORDERS of HAMBURGERS, HOT CAKES and OTHER FOODS to TASTY GOODNESS in NEW RECORD TIME.



Just turn the thermostat dial to the temperature selected for each food. Quickly it's done to a turn with all natural flavor and juiciness preserved. The heavy ½" nickel alloy steel plate is welded to the rounded stainless rims. No grease seepage possible. Closest precision control of temperature over every square inch of grill surface so each order is finished to the same perfection. Proved in thousands of installations across the country. The best that money can buy for years of satisfactory operation.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Streamlined in Stainless Steel for Cleanliness

A. G. A. APPROVED

...B.T.U. per burner ...00. Add 2" to height ...legs are added.

...ing ...ber	Size of Plate	Overall Depth	Width	Height to Rims	Height to Back Splash	No of Burners	No of Thermo-stats	Ship. Wght.
...24	20"x21"	24"	24"	9⅜"	13 7/16"	2	1	137 lbs.
...36	20"x33½"	24"	36"	9⅜"	13 7/16"	4	2	213 lbs.

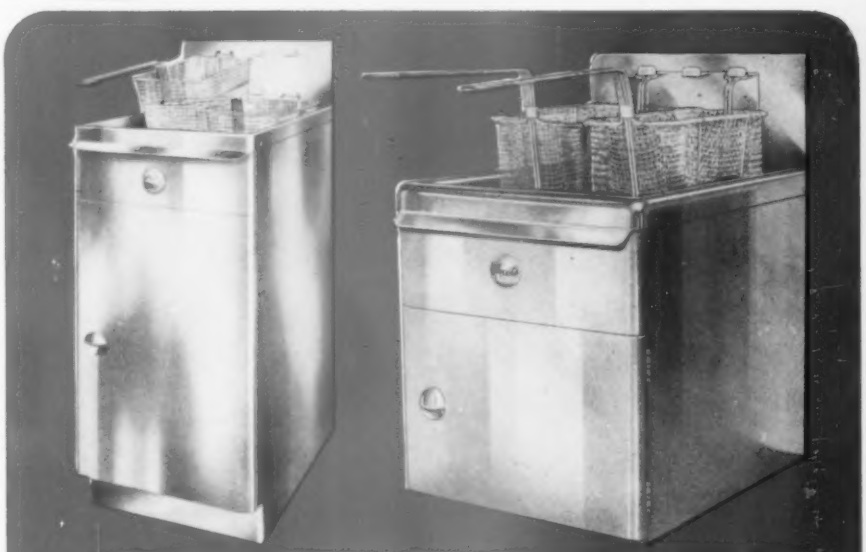
Cabinet, rims and back splash are streamlined in sparkling stainless steel for ease of cleaning and customer eye-appeal. Handy lift-out grease tray fits into receptacle welded to plate and back splash. 1-¼" pipe nipple welded to bottom of receptacle for remote disposal of grease.

Now you fry hot dogs, etc. by flooding the plate with fat. Air cooled design of rims prevents any creepage of fat. For details write for Bulletin No. 189.



Amets FAMOUS DEEP PAN FRIED CHICKEN FRYER IS THE ANSWER TO BIG PRODUCTION

...ies only 12 lbs. or more of fat. Simple to use. Elevating ...el tilts kettle from level to 2" pitch. Set one thermostat ...re-cooking and the other for finishing temperatures. ...e the chicken pieces at one end, close the steam hood. ...e the chicken to the opposite end and put in a fresh ...for continuous production. Serve orders from warming ... Cabinet, steam hood and kettle sides are of stainless ... Write for Bulletin No. 212 for details. Size 45-5/8" ... x 27-5/8" deep and 48-1/2" high. Max. B.T.U. input ...00. Shipping Weight, 425 lbs.



Filter-as-you-Fry **to SAVE FAT and SERVE TASTIER FOODS that ATTRACT and HOLD CUSTOMERS**

The floor and counter models shown above are speedier than ever. They fry 30 lbs. of weighed raw potatoes to finished french fries per hour. Temperature is always up, ready for the next load. Steel radiants welded to bottom of kettle increases heat input for faster recovery. Smooth inside of kettle with no obstructions make cleaning easy. Write for Bulletin No. 209.

MODEL	WIDTH	DEPTH	HEIGHT	MAX. BTU.	FAT CAP.	SHPG. WT.
FGS–11" Floor	13-5/8"	17-1/16"	33½"	30,000	18 lbs.	100 lbs
CGS–11" Counter	13-5/8"	17-1/16"	21¾"	30,000	18 lbs.	70 lbs

Anets NEW BUN PAN SIZE DONUT Filter-Fryer



USES ONLY 65 LBS. OF SHORTENING AND SAVES UP TO 80 LBS. AT EVERY FILLING

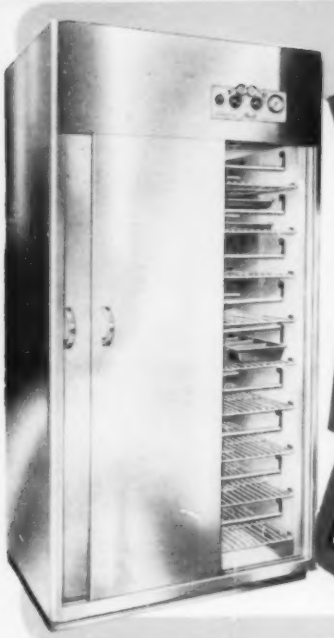
Turns out approximately four dozen 2½" diameter yeast raised donuts per tray load. Takes 17½" X 25½" tray. Also used to fry fish, shrimp and chicken. One installation of this unit produces 1200 lbs. of fish steaks in eight hours. They were frozen solid when put in the fryer. Despite this extreme cold loading, the fat temperature was recovered so that a new cold load was processed every 2½ minutes. That's frying speed that only an Anets BFG-18" X 26" Filter Fryer can give you. Besides the big fat saving in each initial loading, no fat has ever been thrown away. Think of the huge fat savings possible. Put it to work for you frying donuts, fish, shrimp, clams, chicken, etc.

SMOOTH INSIDE OF KETTLE IS EASY TO CLEAN. No tubes or obstructions inside the smooth kettle make cleaning easy and fast. Forty-eight steel radiants are electrically welded to sloped outside of bottom of kettle to increase the heating surface for faster heat recovery and bigger frying production.

FAT KEPT CLEAN with FILTER TRAY

Fits right in bottom of kettle. Has perforated strainer in middle. Fat rotates from sides of kettle to center. Deposits crumbs and flour accumulations on tray. Just lift out tray and empty. It keeps fat cleaner and clearer.

SPECIFICATIONS OF MODEL BFG-18" X 26". Fully enclosed cabinet with fold-over drain board. Heavy gauge steel kettle takes 17½" X 25½" tray. Heavy duty 1" gate drain valve. Width 24", Depth 38", Width, including drainboard 32½". Comes equipped with three trays, one crumb tray and one lift-out tray cradle. Write for bulletin No. 107 for full details. Approximate shipping weight 275 lbs.



NO SWEATING
NO FLOODING
NO CRIPPLES

NO CRUSTING
or
LOSS of WEIGHT

UNIFORM PROOF
on
EVERY SHELF

FULL VOLUME
BOX is ALWAYS
SWEET and CLEAN

YOU SAVE MONEY WITH CONTROLLED PROOFING AND PRODUCE BETTER QUALITY BAKED GOODS.

IMPROPER PROOFING CAUSES 25% OF DEFECTIVE BAKED GOODS. ____ say practical bakers who must have controlled proofing to eliminate waste. Each type of dough requires a different temperature and humidity accurately controlled to produce the best volume and uniformity of product. Anets Air Conditioned Cabinet Proof Boxes offer the best solution to eliminate waste and turn out a quality product every day.

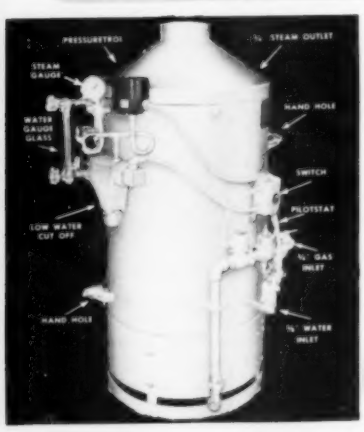
MODEL SR–170 IN STAINLESS STEEL WITH AUTOMATIC AIR CONDITIONER

Made with full ½" metal-clad sealed-in insulation. Has patented, removable sliding doors. Patented Rol-A-Way rods double capacity when used for buns or rolls. Model illustrated has Automatic Steam Coil Air Conditioner.

CAPACITY. 170 one-lb. loaves with the shelves spaced 5¼" apart or 36 bun pans size 18" X 26" spaced 3" apart. Has nine heavy duty shelves size 27" X 40". OVERALL SIZE: Width 44", Height 87", Depth 32". WRITE FOR BULLETIN No. 101 FOR OTHER SIZE MODELS.



WRITE FOR THIS FREE BOOKLET THAT TELLS THE WHAT AND HOW OF CONTROLLED PROOFING. ASK FOR OUR PROOFING BOOKLET.



NEW 2-4 H.P. A.S.M.E. BOILER WITH AUTOMATIC CONTROLS. Provides an economical low pressure steam for oven, proof-box, steam kettle, vegetable steamer, etc. Built to A.S.M.E. code. Tested and certified by boiler insurance inspectors. Write for bulletin No. 117.

Anets NEW MIDGET BENCH SHEETER

MODEL MDR-4C

Sets on top of your work bench. Eliminates laborious hand work...5 to 6 times faster too! Sheets all types of doughs for sweet goods, pies and Pizza pie doughs to a smooth uniform thickness. Eliminates the punishment of hand-rolling. Keeps the doughs tender and alive for a better baked product. Precision-ground rollers open from 0" to 1" and are 18" wide to take larger dough pieces. Easy to operate. Plugs into 110 volt A.C. outlet.

OVERALL SIZE: Width 27½", Length 27½", Height 15¾". Motor ¼ H.P., 1725 R.P.M. Roller speed 60 F.P.M. Shipping Weight approximately 250 lbs.

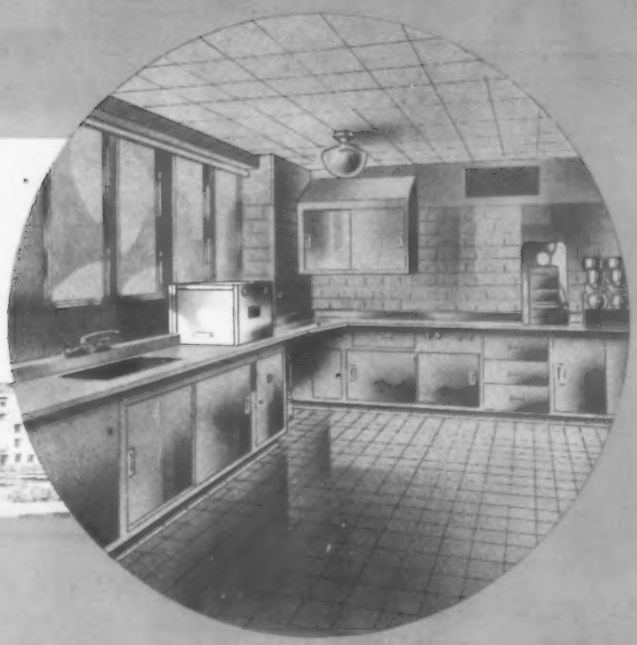


ANETSBERGER BROTHERS, INC.
185 N. ANETS DR., NORTHBROOK, ILL.
PHONES: NORTHBROOK 770 771 772

E b/2



of the sixteen diet kitchens at Hartford Hos-
with Autosan R-16 in enclosed cabinet.

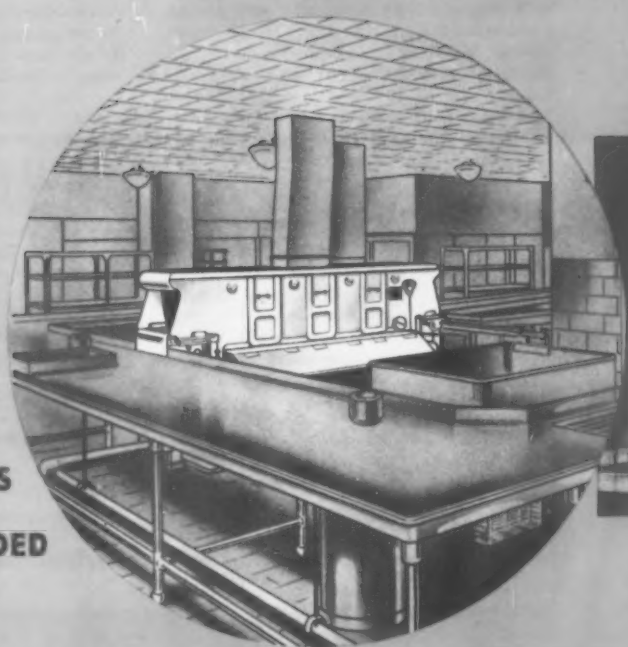


This equipment
is especially
designed for
use in
HOTELS
SCHOOLS
HOSPITALS
CAFETERIAS
RESTAURANTS
SANDWICH SHOPS
LARGE RESIDENCES

COLT AUTOSAN

DISHWASHING · SANITIZING and DRYING MACHINES

VEGETABLE PEELERS

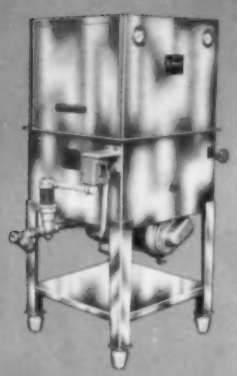




Autosan Model C-3 in banquet kitchen dish-
washing room of the Hotel Statler, Washington, D. C.

de in Hartford,
nnecticut, by
e makers of
OLT REVOLVERS &
UTOMATIC PISTOLS
OLT CUSTOM-MOLDED
ASTIC PRODUCTS
OLT PACKAGING
CHINERY

THERE'S A COLT AUTOSAN



CAPACITY: UP TO 900 DISHES (1500 GLASSES) PER HOUR*

MODEL R-16A is designed for straightaway or corner installation. Though it will deliver 800 to 900 dishes or 1500 glasses per hour, it requires a minimum of space. R-16A can be installed for auxiliary use in large kitchens, or for the complete job in small restaurants and diet kitchens.

DESIGN: A compact stainless steel or galvanized iron rack type machine with easy operating counterbalanced doors; pump; motor; thermometers; electric or steam heater; and racks. *Automatic timer optional at extra cost.*

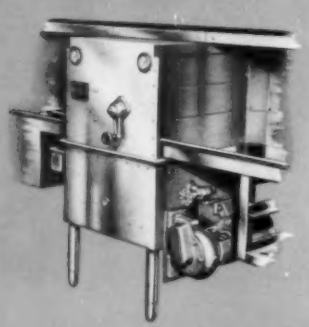
HEATING: Standard equipment to include 1000 watt, 110 or 220 volt electric immersion heater, with built-in snap switch or with steam injector. No moving parts located on machine above table height.

DIMENSIONS:

Length at table height	21"
Width at table height	21"
Height above tables	17¼"
Overall height of machine	51¼"
Weight (machine with stand)	
Approx. Net	270 lbs.
Crated	355 lbs.

Also available as Model R-16AT with automatic timing.

* Under Average Conditions



CAPACITY: UP TO 900 DISHES (1500 GLASSES) PER HOUR*

MODEL CU-16 is designed for under counter, back bar or fountain installations. CU-16 takes only 21 x 21 inches of counter space, is adjustable to fit varying heights, yet it washes and sanitizes up to 900 dishes or 1500 glasses an hour.

DESIGN: A compact stainless steel rack type machine for under-counter installation, with easily operated telescoping doors; pump; motor; electric or steam heater; thermometers; and racks. *Automatic timer optional at extra cost.*

HEATING: Standard equipment to include 1000 watt, 110 or 220 volt electric immersion heater with built in snap switch or with steam injector.

DIMENSIONS:

Length at table height	21"
Width at table height	21"
Height above tables	16¼"
Overall height of machine	34½" to 40"
Weight Approx. Net	300 lbs.
Crated	385 lbs.

Can be installed under counters from 36" high to 42" high.

Also available as Model CU-16T with automatic timing.

* Under Average Conditions



CAPACITY: UP TO 1250 DISHES PER HOUR*

MODEL R-1A supplies maximum capacity in minimum space. It requires only 27 x 27 inches of table space and may be installed for either straightaway or corner operation. R-1A washes and sanitizes 1250 dishes per hour.

DESIGN: A compact machine, ruggedly built of stainless steel. Rack type with single tank and stationary sprays. Provided with easy-operating balanced doors; pump; motor; control switch; filling and drain valves; tank heating equipment and thermometers. *Automatic timer optional at extra cost*

HEATING: Standard equipment includes steam injector with valve or gas burner with pilot lighter. Electric heating equipment can be furnished at small extra cost.

DIMENSIONS:

At table height	27" x 27"
Working level, from floor	34"
Length overall	35"
Width overall	30½"
Height closed	60½"
Height open	74"
Weight: Approx. Net	525 lbs.
Crated	650 lbs.

Also available as Model R-1AT with automatic timing.

* Under Average Conditions



CAPACITY: UP TO 2400 DISHES PER HOUR*

MODEL RC-3 is a completely new heavy duty machine. Its safety-protected *chain* conveyor with driving lugs picks up and discharges racks with less handling, permits use of standard racks. Separate switch control of pump and conveyor drives allows sanitizing *without* washing where brush washing of glasses is required.

DESIGN: Ruggedly-built welded stainless steel hood and tank. New wash chamber door gives easier access to interior, simplifies tube and scrap tray removal by female attendants. Complete with motor; pump; motor control switches; filling and draining valves; tank heating equipment; and thermometers.

HEATING: Standard equipment includes steam injector with valve or gas burner with pilot lighter. Electric heating equipment can be furnished at small extra cost.

DIMENSIONS:

Length between tables	42"
Width overall	27"
Height	54"
Working level	34" from floor
Weight: Approx. Net	600 lbs.
Crated	800 lbs.

Also available as Model RC-30 with integral PRE-FLUSH Chamber. Overall length 62".

* Under Average Conditions

COLT AUTOSAN

THE Only DISH

TO FIT EVERY KITCHEN

CAPACITY: UP TO 4800 DISHES PER HOUR*

MODEL R-3 uses suprisingly little space for its big capacity of 4800 dishes per hour. R-3 is a rack conveyor type machine built, like all Colt Autosans, for long, trouble-free service.

DESIGN: Double tank, stainless steel machine complete with pump; motor; motor control switch; filling, steam and drain valves and thermometers. Equipped with flexible and removable curtains; conveyor; vertical, sliding, leak-proof door for easy access to machine interior.

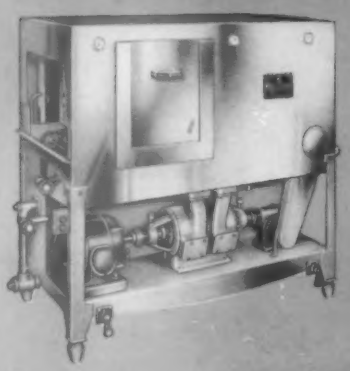
HEATING: Standard equipment includes steam injector with valve. Gas or electric heating can be furnished at extra cost.

DIMENSIONS:

Length between table connections	60"
Width (table height)	30"
Height	57"
Vertical clearance of hood opening	16"
Working level, from floor	34"
Weight: Approx. Net	1080 lbs.
Crated	1475 lbs.

Also available as Model R-30 with integral PRE-FLUSH chamber and built-in Vent Duct. Overall length 80".

* Under Average Conditions



CAPACITY: UP TO 6000 DISHES PER HOUR*

MODEL R-4 is designed basically the same as R-3. Model R-4 turns out 6000 dishes per hour with its 3 h.p. motor and pump. Its table to table length is 70 inches.

DESIGN: Same as R-3 except with 2 doors.

HEATING: Same as R-3.

DIMENSIONS:

Length between table connections	70"
Width (table height)	30"
Height	59"
Vertical clearance of hood opening	16"
Working level—from floor	34"
Weight: Approx. Net	1190 lbs.
Crated	1625 lbs.

* Under Average Conditions



CAPACITY: UP TO 6000 DISHES PER HOUR*

MODEL R-40 is equipped with built-in PRE-FLUSH chamber which eliminates the need for an unsightly, unsanitary, work-slowing pre-wash station. R-40 will deliver 6000 washed and sanitized dishes per hour without cleaning or servicing.

DESIGN: Double tank rack conveyor machine constructed of stainless steel. Components subject to wear interchangeable. Complete with pumps; motors; motor control; filling, steam and drain valves; thermometers and curtains.

Available only with built-in Vent Duct

DIMENSIONS:

Length between table connection	90"
Width (table height)	30"
Height	59"
Vertical clearance of hood opening	16"
Working level—from floor	34"
Weight: Approx. Net	1345 lbs.
Crated	1825 lbs.

* Under Average Conditions



CAPACITY: UP TO 9000 DISHES PER HOUR*

MODEL R-8 is a larger version of R-3 and R-4. Its 5 h.p. motor and pump provide it with a capacity of 9000 dishes per hour. Table to table length is 90 inches.

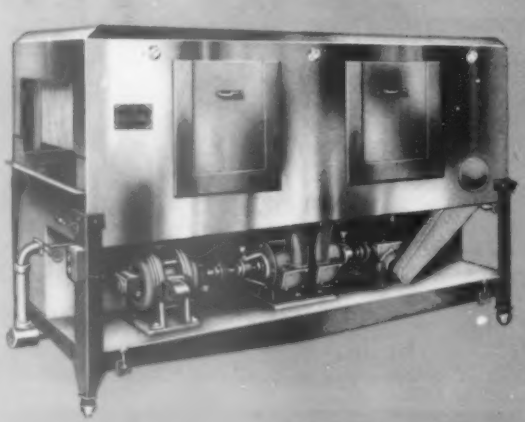
DESIGN: Same as R-3 except with 2 doors.

HEATING: Steam injector with valve.

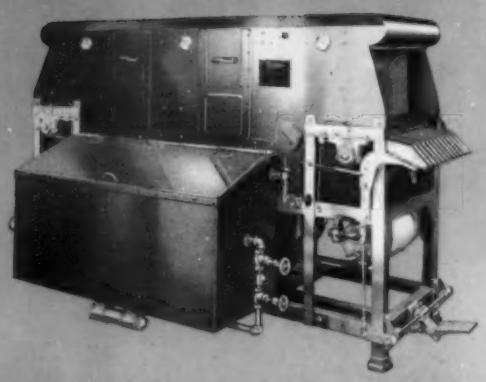
DIMENSIONS:

Length between table connections	90"
Width (table height)	30"
Height	59"
Working level	34"
Vertical clearance of hood opening	16"
Weight: Approx. Net	1700 lbs.
Crated	2100 lbs.

* Under Average Conditions



WASHING MACHINE WITH *Cloudburst Action*



CAPACITY: ALL TABLEWARE FOR 2000 PERSONS PER MEAL*

MODEL C-22 is a belt conveyor type, designed for large, busy kitchens. With its outstanding capacity the C-22 does the complete dishwashing job for as many as 2000 persons and more per meal.

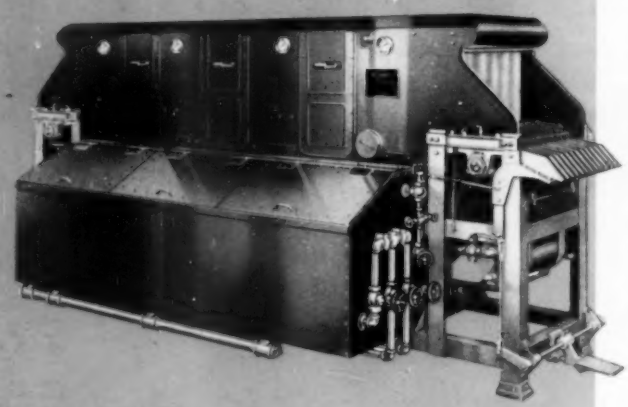
DESIGN: Double tank stainless steel machine complete with motor; motor control switch; steam booster (for final rinse water); water and steam valves; thermometers; and waste line connections. Piping and fittings of brass.

HEATING: Steam injector with valve for each tank. Gas or electric heating can be furnished at extra cost.

DIMENSIONS:

Length *(table to table)*	87"
Width	50"
Conveyor width	22"
Height	60½"
Working level of tables	34"
Weight: Approx. Net	2875 lbs.
Crated	2600 lbs.

* Under Average Conditions



CAPACITY: ALL TABLEWARE FOR 2500 PERSONS PER MEAL*

MODEL C-3 is the outstanding heavy duty dishwashing machine for large kitchens. It turns out cleaned and sanitized dishes for as many as 2500 persons per meal utilizing a cushioned conveyor which prevents metal from touching glass or china, thus avoiding chipping.

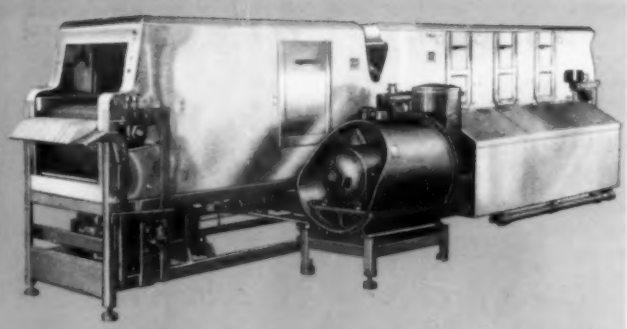
DESIGN: Same as C-22, except with 3 tanks.

HEATING: Steam injector with valve for each tank.

DIMENSIONS:

Length *(table to table)*	120"
Width	50"
Conveyor width	22"
Height	60½"
Working level of tables	34"
Weight: Approx. Net	2950 lbs.
Crated	3225 lbs.

* Under Average Conditions



CAPACITY: ALL TABLEWARE FOR 2500 PERSONS PER MEAL* WASHED, SANITIZED, AND DRIED

MODEL C-3—C-300 is a high capacity washer-drier combination that services tableware for as many as 2500 patrons per meal . . . washed, rinsed, sanitized, dried, and ready for instant re-use *without* costly extra handling. This "assembly line" process is efficient — its output per square foot of floor space exceeds that of any other combination. Cushioned conveyor prevents chipping; filtered air under pressure assures fast drying.

DESIGN: Dish washer is triple tank stainless steel complete with motor; control; steam booster (for final rinse water); valves; thermometers. Pipings and fittings of brass.

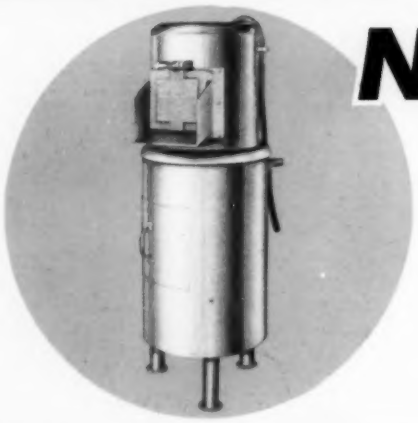
Drier is constructed of stainless steel. Complete with motors; control and hermetic compressor. Operates without heat.

DIMENSIONS:

Length *(table to table)*	220"
Width overall	50"
Height	80½"
Conveyor width	22"
Working level of tables	34"
Weight: Approx. Net	5550 lbs.
Crated	6425 lbs.

C-22 — C-300 combination also available.

* Under Average Conditions



NEW!

MODEL P-30 VEGETABLE PEELER

Adaptable to any condition. Twelve positions for discharge chute provide flexibility of location for built-in peel trap, access plate, and chute. Balanced disc is vibrationless; its scientific design forces vegetables to roll, assures waste-free, fast peeling. Flexible hose for flushing every part of machine.

DESIGN: Modern, "clean", compact. Aluminum and stainless construction. Abrasive-fused disc. Vinyl plastic hose. V-belt drive mechanism. Motor protected—grease sealed ball bearings.

DIMENSIONS:

Width	19"
Height	48¾" to 51½"
Height of chute, adjustable from	33" - 36"
Weight: Approx. Net	225 lbs.
Crated	300 lbs.

For Complete Specifications and Engineering Data Write:

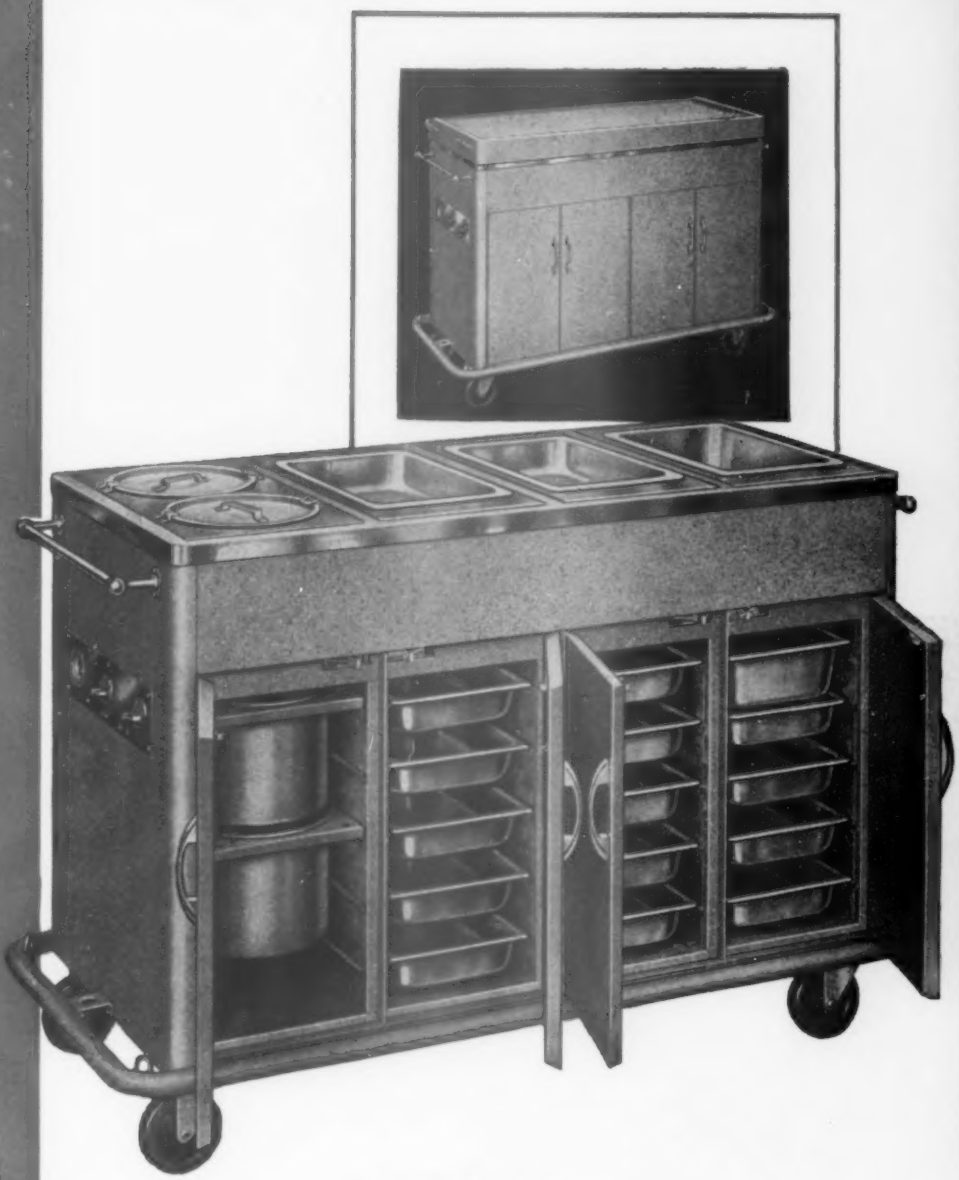
COLT'S MANUFACTURING COMPANY

AUTOSAN DIVISION

HARTFORD 15, CONNECTICUT

PRINTED IN U. S. A. 2-54

NOW... hot meals in all schools from one kitchen with NACO *portable* ELECTRIC FOOD CARTS



Model H. C. P.

NACO lowers your food service costs... keeps food hot or cold, fresh, and delicious.

Now you can prepare food in one central and economical kitchen; then deliver and serve hot meals to *every* school.

Manufactured by the makers of famous Atlas Food Service Equipment

NATIONAL CORNICE WORKS

ESTABLISHED 1911

1323 CHANNING STREET, LOS ANGELES 21, CALIFORNIA

Check the features of the NACO



- LOWER COSTS
- HOT MEALS
- DRY HEAT
- LESS FOOD WASTE
- INSULATED
- SPECIAL 'COOL'
- 200-300 MEAL
- EASY TO CLEAN
- LESS MAINTENANCE
- PORTABILITY
- NO SPECIAL WIRING
- SECTIONAL HEAT

Smaller school districts

can now centralize their kitchens

and save considerably while

benefiting all students

PRINTED IN U. S. A. 2-54



LOWER OPERATING COSTS

By eliminating the high investment required for individual kitchens in each school, Naco Portable Electric Food Carts lower food service costs to rock-bottom, without sacrificing highly desirable, delicious and healthful meals. With Naco, all meals may be cooked in one central kitchen, then delivered to outlying areas. Food is kept warm in three insulated 'hot' compartments which retain heat for 12 hours. In the fourth section, salads and other 'cool' foods can be kept at room temperature or refrigerated with dry ice. Naco carts also save on personnel needed to operate individual kitchens. This saving alone can amount to many thousands of dollars each year.

FOOD IS ALWAYS HOT, OR COOL, AS DESIRED

After delivery to the school, meals may be kept warm in the Naco. The Naco has an 8-ft. extension cord for any electrical convenience outlet. Just plug in and food is kept kitchen-warm. A separate 'cool' section is for foods which are not to be served hot.

200-300 MEALS PER CART

Naco Portable Electric Food Carts have a capacity of 207 to 222 quarts of food—enough for 200-300 meals per cart. The Naco has been designed to fit conveniently into the cafeteria serving line. After use, it is easily removed from the line for transporting back to the main kitchen.

SECTIONAL HEAT REGULATORS

The two 'hot' sections of the Naco have individual heat regulators, assuring complete radiated and circulated heat at desired temperatures. The 'cool' section for salads, desserts, etc., ordinarily will never be more than 8° over room temperature. By packing with dry ice, this section may be refrigerated indefinitely very simply and quickly.

Lower your operating costs with NACO . . . only NACO allows *one* kitchen to do the job of many!

NACO PORTABLE ELECTRIC FOOD CARTS CAN HELP YOU, TOO

SIZE

34¼"x24"x38" high. Overall including bumper and cover, 50"x27"x41" high.

BODY

Attractive gray hammer-tone baked enamel finish, heavy galvanized iron exterior; aluminum interior. Exterior walls are 1" thick with fiberglas insulation. For added safety, all outside vertical corners are rounded. The top is stainless steel with four panels for serving pans. (Pans not supplied.) In addition two interchangeable panels are furnished, each to accommodate two fireless cooker pots (for soups, mashed potatoes, etc.) An insulated cover fits over top. This cover may be used as a separate table-top to expedite serving in the cafeteria line (for bread, rolls, etc.). Interior of body sections have angle runners for convenient changing of serving pans as serving progresses. The wall between 'hot' sections and the 'cool' section is insulated with 1½" fiberglas.

Can be furnished all stainless steel on special order.

CAPACITY

Each Naco easily serves complete meals for 200-300 persons, with a capacity of 207-222 quarts of food. Each section of the Naco has been designed to hold any variety of vegetables, meats and soups. Designed for six serving pans, or six fireless cooker pots per section. For total capacity see chart on back page.

'COOL' SECTION

This section, normally not over 8°F. above room temperature, has been insulated so that it may be used as a refrigerated unit when packed with dry ice.

NO SPECIAL WIRING

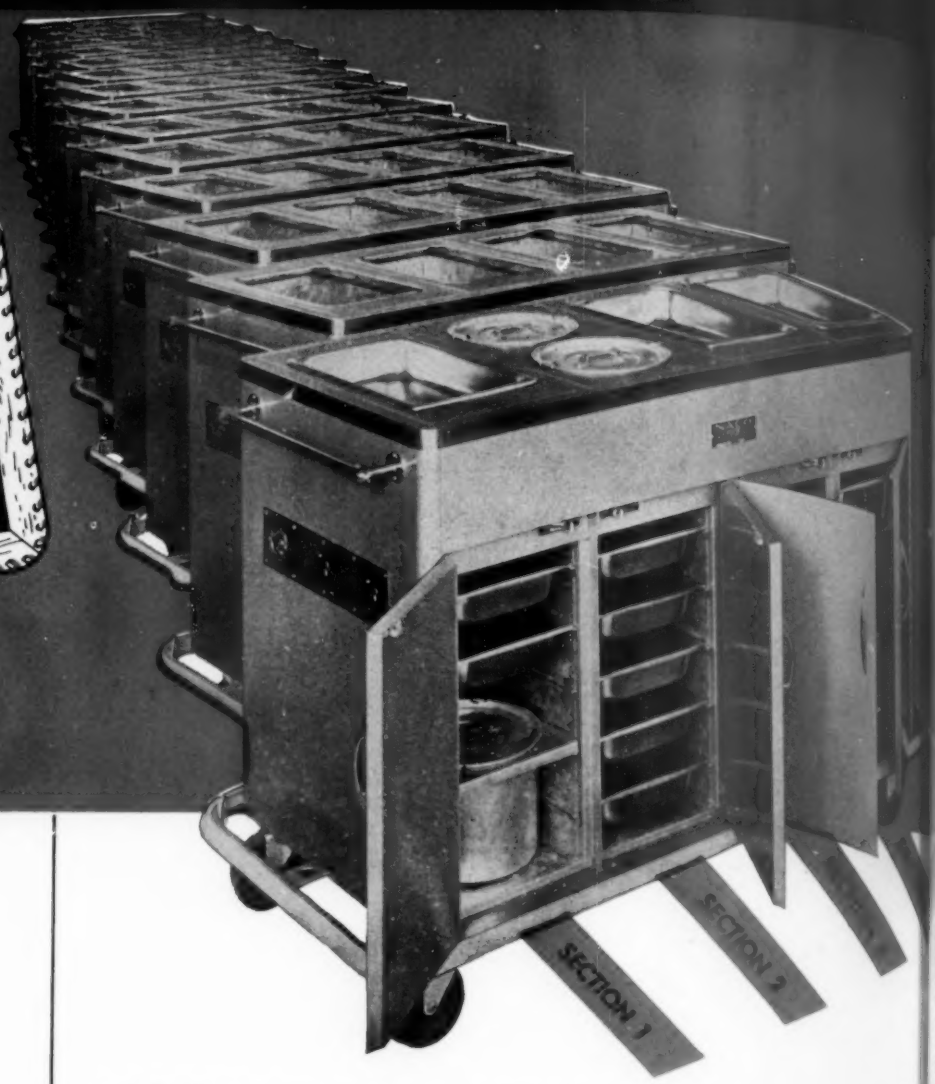
To use a Naco requires no additional or special wiring. Merely plug in the 8'-extension cord to any standard electrical outlet, and all food is ready promptly to serve oven-hot. Each of the 'hot' sections is provided with two 250 watt, 110 volt strip heaters controlled by a 3-heat switch for convenient regulating. Total load 1500 watts.

SILENT OPERATION

The Naco is completely silent in operation. It moves on four 5" ball-bearing rubber-tired swivel casters of 300 lb. capacity each. For added protection around the entire cart there is a rubber bumper set into a steel channel frame. Aluminum alloy push handles are standard equipment.

NACO PORTABLE ELECTRIC FOOD CARTS Carry the UNDERWRITERS' LABORATORIES, INC., SEAL OF APPROVAL

Among users of Naco Portable Food Carts is the Norwalk (California) School District who recently bought these fifteen carts to bring the advantages of warm meals to their pupils without installing separate kitchens in each school.



for economy and efficiency investigate

NACO

portable

ELECTRIC FOOD CARTS

let ONE kitchen do the job of MANY with NACO!

PLENTIFUL FOOD CAPACITY WITH EACH NA

SECTION	"A" CONTAINER	UNIT CAPACITY	QUANTITY	"B" CONTAINER	UNIT CAPACITY	QUANTITY	TOTAL "A" CONTAINER	TO
1	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55⅛
2	#4798	8 Qt.	6	#4798	8 Qt.	6	48 Qt.	48
3	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55⅛
4	#165	5⅞ Qt.	6	#1654	9⅛ Qt.	6	35¼ Qt.	55⅛

Note: *Not* equipped with serving pans or fireless cooker pots.

For further information, consult your architect, food service equipment supplier, or National Cornice Works.

Manufactured by the makers of famous Atlas Food Service Equipment

NATIONAL CORNICE WORK

ESTABLISHED 1911

1323 CHANNING STREET, LOS ANGELES 21, CALIFORNIA

PRINTED IN U. S. A.

distributed by

Market Forge STEAM COOKERS



Market Forge Steam Cookers provide the best in food service and efficiency. The complete line of steam cookers shown on these pages includes — **COMBINATION UNITS** — gas or electrically operated for the kitchen without direct steam that needs a steam jacketed kettle and a pressure cooker. **COUNTER MODEL PRESSURE COOKERS** for the smaller restaurant or the specialized kitchen. These are available for operation with gas, electricity or direct steam. **COMPARTMENT TYPE STEAM COOKERS** for the large kitchen. Direct Connected (2, 3 or 4 compartments) for the installation where direct steam is available. Gas or electrically operated (two compartment only) for the kitchen that does not have direct steam.

MODEL ST-KG
Gas Operated Combination Unit

This unit provides a Direct Connected Steam-It Pressure Cooker and a 20-gallon direct connected steam jacketed kettle. Pressure cooker has a capacity of three 12″ x 20″ x 2¼″ deep standard size cafeteria pans (one half bushel cooking capacity). Steam is furnished by a two-H.P. ASME gas fired boiler complete with controls located in the cabinet.

MATERIAL — *Kettle*, stainless steel; *Cabinet*, stainless steel; *Pressure Cooker*, stainless steel with aluminum cooking cylinder. Overall dimensions: Width 65½″, height 58″, depth 31⅜″. Gas, water and drain connections required.

MODEL ST-KE
Electrically Operated Combination Unit

This unit is the same in size and appearance as the model ST-KG as shown above. In the electrically operated combination units steam is furnished by a 24-KW boiler. Boiler is automatically controlled by pressure regulator, and water feeder. 208/240-three phase-60-cycle power, water and drain connections required.



MODEL ST-S
Direct Connected

The Direct Connected Steam-It provides a single compartment pressure cooker that will operate at fifteen pounds pressure from steam supply available on the premises. Steam-It has a capacity of 3 12″ x 20″ x 2¼″ deep standard cafeteria pans. Steam Control is synchronized thermostatic with ½″ steam supply and exhaust valves.

MATERIAL — Stainless steel with 3/16″ aluminum cooking cylinder. Dimensions: Width 18½″, depth 30″, height 28″. Steam and drain connections required.



ST-E AUTOMATIC ELECTRIC STEAM-IT

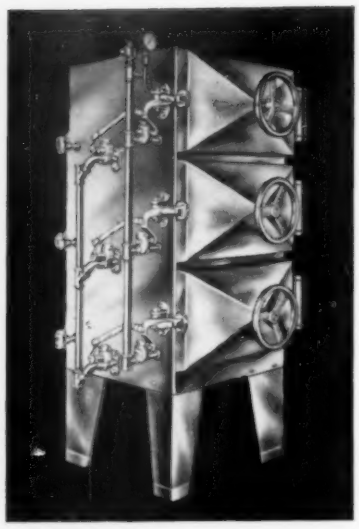
The Market Forge Electric Steam-It provides a single compartment automatic pressure cooker with a capacity of 3 12″ x 20″ x 2¼″ deep standard cafeteria pans. The power is controlled to maintain pressures up to 15 P.S.I. The complete cooking cycle is controlled by the timer.

MATERIAL — Stainless steel with 3/16″ aluminum cooking cylinder. Dimensions: Width 18½″, depth 30″, height 28″. 12 KW 208/240-single or 3-phase 60-cycle power is only connection required.

ST-AG AUTOMATIC GAS STEAM-IT

The Market Forge Gas Steam-It provides a single compartment automatic pressure cooker with a capacity of 3 12″ x 20″ x 2¼″ deep standard cafeteria pans. Fuel input (25,000 B.T.U.) is controlled to maintain pressure up to 15 pounds. The complete cooking cycle is controlled by the timer.

MATERIAL — Stainless steel with 3/16″ aluminum cooking cylinder. Dimensions: Width 18½″, depth 30″, height 28″. ½″ gas (25,000 B.T.U.) 110 Volt electric connections required.



STEAM COOKING SAVES . . . . SPACE — TIME — LABOR — FUEL — FOOD VALUES

All the true flavor of food is saved . . . the vitamin content sealed in . . . the natural color retained when you cook with Market Forge Steam Cookers.

Space — Designed to handle larger quantities in smaller areas . . . note the compact design which saves space in the kitchen.

Time — Steam Pressure Cooking with Market Forge Steam Cookers saves time. Ordinary cooking times are cut in half.

Labor — It's cleaner, too! No handling of heavy pots of boiling water, no scouring of pots and pans — you get more done with less labor.

Saves Fuel — You use less than half the fuel of ordinary methods . . . cooking speeds are miraculously fast — work is easier because it is quick, clean and keeps your kitchen cooler.

MODEL 3M
Direct Connected MARKET FORGE Steam Cooker

This unit provides a direct connected Steam Cooker equipped with synchronized thermostatic control. Doors are provided with stainless steel interiors, one piece gaskets that may be replaced without cementing. Acme type door wheel screws and bronze screw bushings, and an insulated outer door. Compartments are 23½″ wide, 24″ deep, 14″ high. Door openings are 11¾″ x 21¼″.

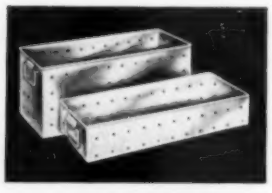
Overall Dimensions — 35″ wide, 32″ deep — Height — Model 2M, 50″; Model 3M, 60″; Model 4M, 71″.

MATERIALS (all sizes are available in two styles).

(1) 3/16″ stainless steel body with enamel exterior.

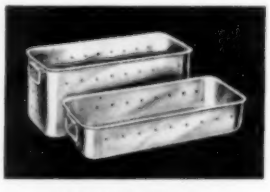
(2) 3/16″ stainless steel body, polished exterior with chrome fittings and doors.

CONNECTIONS — ¾″ steam supply (34.5 lbs. per compartment). 1″ drain line to open sink or floor drain.



SPECIFICATIONS
Seamed Basket

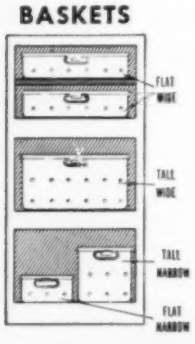
Baskets formed from 24 gauge stainless steel with corners lap seamed and spot welded and top edge rolled over ¼″ stainless steel wire.



SPECIFICATIONS
Seamless Basket

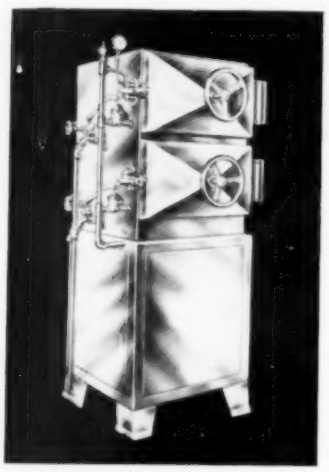
Baskets drawn from one piece 20 gauge 18 & 8 stainless steel, providing rounded corners and a satin sanitary finish inside and out.

BASKETS



Automatic Sliding Stainless Steel Shelves, one piece die formed, will pull out when doors are opened. Makes hot baskets accessible without reaching into compartment.

Intermediate Removable Stainless Steel Shelves, one piece die formed, permit the use of additional shallow or flat baskets. Available for all models. Also available as a sliding intermediate shelf.



MODEL 2M-G
Gas Fired MARKET FORGE Steam Cooker

This unit provides a two compartment gas fired steam cooker equipped with synchronized thermostatic control. Doors are provided with stainless steel interiors, one piece gaskets that may be replaced without cementing. Acme type door wheel screws and bronze screw bushings and an insulated outer door. Steam supply is from a two H.P. (ASME) boiler complete with controls located in the base of the unit. *Compartments* are 23½″ deep, 14″ high. *Door Opening*, 11¾″ x 21¼″. *Overall dimensions*, 35″ wide, 34″ deep, and 66″ high.

MATERIALS (available in two styles).

(1) 3/16″ stainless steel body with enamel exterior and enameled steel base.

(2) 3/16″ stainless steel body, polished exterior with stainless steel base and chrome fittings and doors.

Connections — ¾″ gas (100,000 B.T.U.) ½″ water, 1″ drain to open sink or floor drain.

MODEL 2M-E
Electric MARKET FORGE Steam Cooker

This unit provides a 2 compartment electric steam cooker equipped with synchronized thermostatic control. Doors are provided with stainless steel interiors, one piece gaskets that may be replaced without cementing. Acme type door wheel screws and bronze screw bushings and an insulated outer door. Steam supply is from a 15 KW (ASME) boiler complete with controls located in the base of the unit. Compartment sizes and materials are the same as shown above for the Model 2M-G steam cooker.

Connections — 15 KW — 208/240 Volt single or three-phase 60-cycle power, ½″ water and 1″ drain to open sink or floor drain.













FSD 1070

Market Forge Company
Food Service Division,
EVERETT 49, MASSACHUSETTS



VERMIN PROOF SHELVING AND BINS

For Dry and Bulk Storage

The storage of canned goods, bulk foods and miscellaneous general storage requirements in hospitals and institutions cannot be properly handled with ordinary type commercial shelving and rack equipment. The MARKET FORGE COMPANY has designed, as a result of study of the general requirements, a type of shelving and bins which may be arranged to suit any and all general requirements. The shelving is completely sanitary and adjustable. Bins in a satisfactory range of sizes for every purpose are available. All bins are completely vermin and dust-proof.

Fronts are provided with card holders for suitable identification. Front edges of shelves are furnished with or without label holders.

All equipment is made of galvanized material as a protection against corrosion and finished in enamel or aluminum bronze to suit requirements.

The wide range of storage requirements encountered makes it impossible to cover every possible adaptation. We illustrate a typical installation and suggest you consult the MARKET FORGE COMPANY without obligation. We proffer complete layout and specification service along with budget estimates.

DETAILED SPECIFICATIONS

TOP SHELF SECTION — Top, back and end enclosures are of No. 20-gauge galvanized steel. Partitions are double thickness No. 20-gauge galvanized steel with cover strips of same gauge. Shelves are of No. 18-gauge galvanized steel flanged down on all sides with corners welded. Shelf supports are adjustable pilaster type with slots on 1 in. centers provided with adjustable and removable spring clips, thus providing for adjustment of shelves of 1 in. increments. Be sure to specify number of removable shelves required per top section. Recommended standard — three shelves.

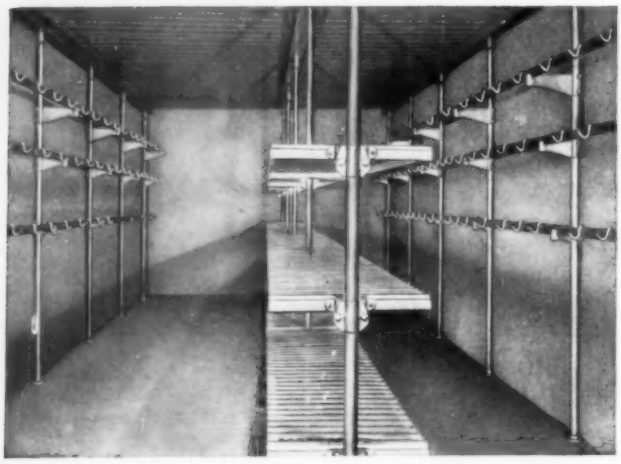
LOWER BIN SECTION — Counter top of No. 12-gauge stainless steel, No. 4 finish or of same gauge galvanized steel with 2-in. rolled rim along front closed at ends. Frame is of 1½ x ½ x 3/16 in. angles entirely enclosed except for bin openings with No. 20-gauge galvanized steel. Legs are of 1¼-in. pipe, welded to angle iron frames fitted with adjustable cone feet for leveling.

Bins — Lower bins are normally 22 in. wide, 21 in. high, 15 in. front to back. These are made of No. 14-gauge black steel, all welded, hot dipped galvanized, with rounded front. Bins are pivoted at the bottom so that they may be tilted forward and are provided with suitable stop at the rear. Each bin is fitted with solid brass pull handles, nickel-plated, with index card holders. Bins are readily removable for cleansing. Upper bin sections are approximately 10 x 10 x 10 in. It is the recommended practice to have two small bins to line up over the one larger lower bin. Recommended alternate bins to be made of No. 16-gauge stainless steel polished No. 4 finish.

DIMENSIONS — Overall length to suit requirements and also contour of room to be equipped. Top shelf sections are generally 12 in. wide with recommended alternates 15 and 18 in. Counter top is generally 12 in. wider than the top shelf section. Floor to top of counter 42 in. Counter to top of top shelf section 4 ft. 6 in. Floor clearance 5¾ in.

FINISH — Where other than stainless steel is specified, galvanized metal should be properly prepared to take enamel finish in color specified. In the absence of definite specifications, dark green baked-on enamel will be furnished.

Metal Craftsmen MAFORCO ... Since 1897



Sanitary Metal Rack Equipment for Refrigerated and General Storage Rooms



Stainless Steel Shelving.

"MAFORCO" WALK-IN REFRIGERATOR EQUIPMENT

Storage Equipment for Refrigerated Spaces

Specialists in the manufacture of shelving and rail racks for refrigerated spaces. Galvanized slatted shelving has been the accepted standard of excellence for many years. This metal equipment with reasonable maintenance will serve satisfactorily for the lifetime of most buildings. Specify this modern equipment especially designed and manufactured by experts in this field.

SPECIFICATIONS

"Maforco" Shelving

Medium Duty — The posts are 1¼ in. outside diameter high carbon steel tubing. Brackets are malleable iron rigidly fixed to posts by means of setscrews. Shelves are continuous frames of high carbon steel angles, in sizes to suit loads imposed, double-riveted at corners. At eight points in each shelf at corners, the horizontal leg of shelf angles is to be die-formed so as to wedge tightly into shelf bracket, thus providing a rigidly self-supporting unit without use of bolts, nuts or other means of fastening. Slats are to be 1 in. x 12-gauge x 1 in. apart, flush riveted to frames with all edges well rounded and chamfered. This slatted construction permits a free circulation of air. Shelf sections should not be longer than 6 ft. Posts are to be neatly finished at top with ornamental acorns and with pressed steel self-leveling floor flanges.

Heavy Duty — Exactly identical to Medium Duty equipment, excepting that posts are standard 1¼-in. iron pipe size with semi-steel cast brackets.

Rail Racks

Medium Duty — 1¼-in. standard pipe for spans not more than 5-ft. centers.

Heavy Duty — 1½-in. pipe for spans not more than 4-ft. centers.

Brackets, Posts, Hooks, Etc. — Brackets are available for the three sizes, providing flush mounting with 3, 6, 9 and 12-in. projections from face of the posts. Rails are 1½ x ⅜-in. steel for light duty and 2 x ⅜-in. steel for medium and heavy duty Removable hooks should be furnished for every 6 in. of rail — 5/16 and ⅜ in. for light duty and ⅜ and 7/16 in. for medium and heavy duty. Posts in every case are to be expanded between floor and ceiling and equipped with self-expanding ceiling flanges and self-leveling pressed steel floor flanges. Rail rack brackets are to be of heavy gauge pressed steel, die-formed, with reinforcing ribs top and bottom edges, and are to be adjustable and removable without moving the posts. Hooks only are to be of mild steel tinned finish. Recommended alternate on hooks — stainless steel.

Self-supporting rail racks as shown are desirable where suspended ceilings do not permit the use of posts-to-ceiling construction. These are available in single or double rail design rigidly constructed to stand on legs with full size floor flanges free from wall or ceiling attachment. Frames are 1¼" standard pipe suitably braced and rails may be two, three or four high. Frame should be located on not more than 4'-0" centers.

Unless otherwise specified, all equipment is to be furnished hot dipped galvanized after fabrication.

"Maforco" equipment conserves valuable refrigerated space. It fits snugly into corners, around projections so as to utilize every inch of available space. All equipment is rigid and self-supporting and does not have to be fastened to refrigeration construction.

Stainless Steel Shelving

Wherever possible, we urge the use of stainless steel shelving and rail racks. The maintenance is reduced to the absolute minimum because cleaning can be simply and readily effected. The bright permanent finish promotes cleanliness and orderliness.

The general construction is the same as the galvanized equipment with the exception that the shelves are of solid #14 gauge material with integral die-formed slats.

Write for detailed specifications and mechanical drawings. These are available without obligation.

General Notes

Shelves are built as wide as conditions require but we do not recommend over 36 in. and a good standard is 24 in. for all general purposes. Shelves less than 18 in. in width are frequently used where door returns require the narrow shelves to avoid projecting into the door opening. In designing refrigerator boxes, it is well to bear in mind the location of the doors with this condition in view.

Meat storage boxes should be specified four or five shelves high. Vegetable and dairy storage boxes, three or four shelves high.

Where stainless steel is required for shelving, we recommend that the shelves only be of stainless steel and in such cases where posts and brackets are required in stainless steel, we recommend that only the light type of construction be used.

It is also generally considered desirable to specify that the back edges of all shelves be furnished with a stop ledge to prevent stored foodstuffs from being pushed back against the walls of the refrigerator. This is not standard and should be definitely noted, if required.

WRITE FOR DETAILS ON NEW TYPE STAINLESS STEEL SHELVING

MARKET FORGE COMPANY · EVERETT STATION BOSTON, MASSACHUSETTS

HALDEMAN-LANGFORD MANUFACTURING CO.

2584 University Avenue, St. Paul 14, Minnesota
Phone: NEstor 6139

Fold-A-Way YOUR SPACE PROBLEMS WITH MULTI-PURPOSE ROOM EQUIPMENT

- DOUBLE the uses of present space
- CUT floor clearing and cleaning costs up to 80%

Fold-A-Way space-saving units give 100% flexibility to any area. Easy to fold and unfold, they can be moved to any location. They save time, labor, upkeep, and expense; eliminate noise and confusion.



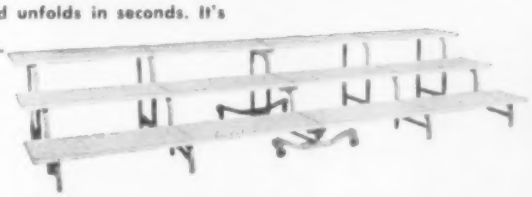
Fold-A-Way BANQUET-TABLE

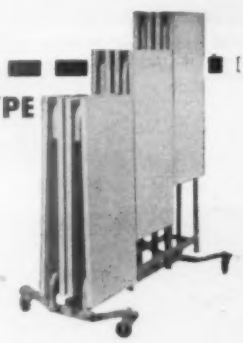


Folds and unfolds in three seconds. Easily operated by a woman, it rolls on its own chassis, passes through ordinary doors. Ideal for banquets or miscellaneous desk service —wherever a table is needed.

Fold-A-Way CHORAL STANDS—STANDING, SEATED AND BAND TYPE

A unique "space-miser," time and labor-saver for schools, churches and institutions, the Fold-A-Way Choral Stand folds and unfolds in seconds. It's perfect for choral groups, class pictures, kindergarten groups, or for display purposes. Basic stand length is 12 feet. Stands combine for semi-circular arrangement.



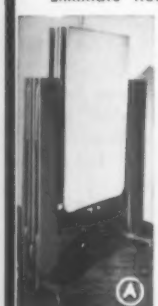


SEE our insert in Sweet's Architectural File or write for free illustrated bulletin.

Erickson

Fold-A-Way TABLES WITH BENCHES FOR DUAL-PURPOSE ROOMS

CONVERT your lunch room into a kindergarten, study hall or activities room. Make your gymnasium double as a cafeteria or Home "Ec" class. Take the waste out of space lost because of permanent fixtures. Save on floor clearing and cleaning costs. Eliminate noise, disorderliness and confusion. Improve morale; speed student traffic; keep rooms orderly and neat.



(A) 14' portable table with benches folded. Casters give instant mobility, easy gliding.



(B) Wall-attached model available with or without benches. Ideal for sculpturing, finger painting classes.



(C) Table unfolded. Top is tan linen Formica. Ten tables folded (seating capacity 240 pupils) can be stored in 10' x 5' area.



(D) One room serves as two or more with Erickson portable tables with benches. Gymnasium (above) doubles as cafeteria.

ROL-FOL TABLE, INC.

Manufacturers and Originators of Detachable Folding Tables and Benches
DISTRIBUTORS IN PRINCIPAL CITIES
8467 Melrose Place, Los Angeles 46, California

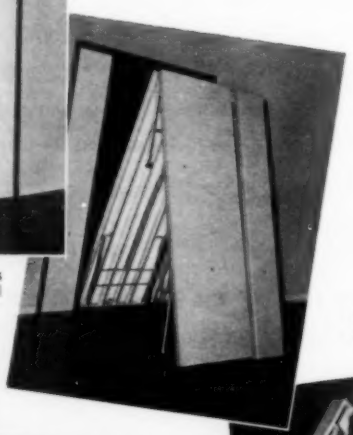
Rol-Fol ...all metal construction with ¼-inch plastic tops

FOLDING TABLES and BENCHES WITH SPACE-SAVING WALL CABINETS

for Multi-Purpose Rooms and Social Halls...



Rol-Fol Table and Benches locked in recessed wall cabinet.



Units unfolding for use.

STRONG, DURABLE ROL-FOL TABLES AND BENCHES, 14-FEET LONG, WITH:

- **PLASTI-Ply top panels in a wide variety of colors and patterns.**
- **Extruded aluminum structural top frames, welded construction, with 2¼-inch wide anodized edge trim.**
- **Cadmium plated steel hardware and tubular steel undercarriage.**

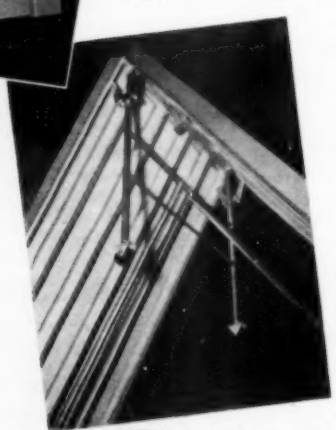
STEEL WALL CABINETS ONLY 5⅛-INCHES DEEP OFFER BUILDING CONSTRUCTION ADVANTAGES.

ROL-FOL IS THE IDEAL SOLUTION FOR Cafeterias or dining areas which must serve multi-purpose room functions.

ROL-FOL ELIMINATES STORAGE PROBLEMS. Fast, easy set-up and storage of tables and benches makes multi-use of a room truly practical. Save time and labor.

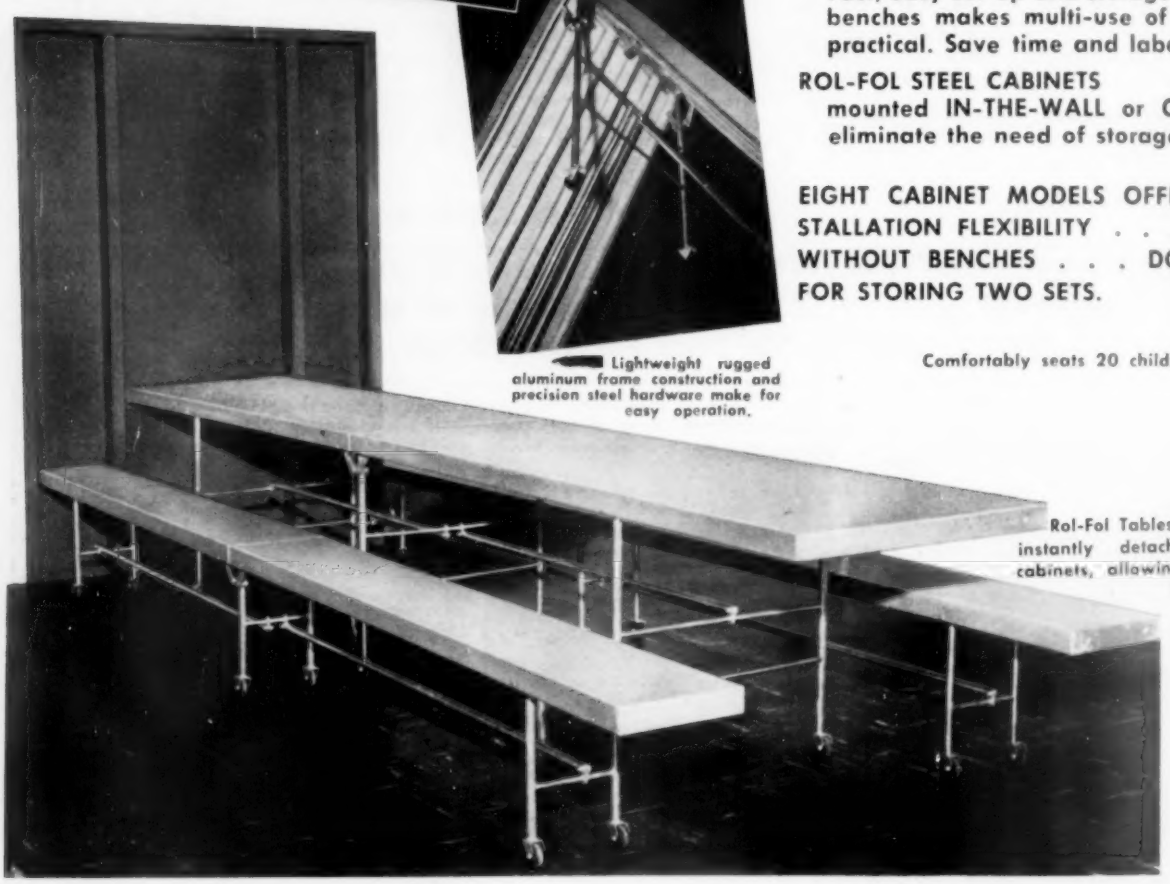
ROL-FOL STEEL CABINETS mounted **IN-THE-WALL** or **ON-THE-WALL** eliminate the need of storage room space.

EIGHT CABINET MODELS OFFER WIDE INSTALLATION FLEXIBILITY . . . WITH AND WITHOUT BENCHES . . . DOUBLE DEPTH FOR STORING TWO SETS.



Lightweight rugged aluminum frame construction and precision steel hardware make for easy operation.

Comfortably seats 20 children.



Rol-Fol Tables and Benches are instantly detachable from the cabinets, allowing various groupings.

Write for further information and name of your nearest distributor.

ROL-FOL TABLES AND BENCHES

All-Metal Construction with ¼-inch plastic tops

SPECIFICATIONS

FOLDING TABLE AND BENCH SETS

Furnish two-leaf folding tables and benches 14 feet long, complete with steel cabinets, in-the-wall (or on-the-wall) Model No. (to be selected) as manufactured by ROL-FOL TABLE, INC., 8467 Melrose Place, Los Angeles 46, California. YOrk 2306. Tables and benches shall be all-metal construction with ¼" Plasti-Ply tops.

TABLES AND BENCHES

Tables shall be 14' long x 28" wide; benches 14' long x 11¾" wide, constructed as follows:

The top framework shall be extra heavy heat treated aluminum extrusions. Apron and trim pieces shall be one continuous member, ¾" x 2¼" special aluminum channel. Longitudinal support members shall be 1¾" x 1" special extruded aluminum hat sections, equally spaced, fitted in and welded to channel. Tables shall have four longitudinal support members, benches two support members.

Under carriage shall be electro-weld, high carbon steel tubing, ⅞" OD 11/16" wall thickness. Leg cross braces only shall be ½" OD x 5/32" wall thickness.

Hardware shall be precision die formed of ⅛" steel.

Casters shall be Colson oil-less, non-marking, rubber tire.

Each table and bench shall be provided with two manually operated nuts and a safety catch lock.

Plasti-Ply top panels, ¼" thick, shall be high pressure laminate of phenolic plastic with two melamine plastic facing surfaces. The decorative face surface color and pattern shall be selected by the purchaser from standard "LAMIN ART" (N.E.M.A. SPEC) samples of high pressure plastic laminate. Plasti-Ply shall be fitted and attached to the top frame to apply a tight flush joint with the apron.

All steel parts shall be cadmium plated, silver luster finish. The extruded aluminum edge frames shall be anodized.

TABLE AND BENCH HEIGHTS

To be selected by purchaser.
Standard table heights: 25", 26", 28", and 30".
Standard bench heights: 15", 16", 17", and 18".
Other heights shall be available.

DETACHABLE AND INTERCHANGEABLE

The extended tables and benches shall be instantly and individually detachable from the cabinet so they can be rolled about for various groupings. Any height table or bench shall operate in any cabinet.

STEEL CABINETS

Wall cabinets to house tables and benches shall be all welded construction of 16 gauge steel. Cabinet depth shall be 5⅛"—(10¼" for T2 and TB-6 Models). When cabinets are set in masonry (specify) three adjustable strap anchors shall be welded to jambs on each side of cabinet by manufacturer. Cabinets shall be factory prime painted. Finish painting after installation shall be done by contractor or purchaser.

INSTALLATION

Contractor or purchaser shall provide wall recesses for in-the-wall models, install cabinets and place tables and benches in cabinets. The cabinets are to be set plumb, true and level and anchored according to manufacturer's recommendations. Sales agent shall provide installation drawings and instructions.

NOTE: The manufacturer reserves the right to make material and design changes to further improve the product.

MODELS			CABINET DIMENSIONS				
MODEL	CABINET APPLICATION	COMPRISES	HEIGHT OVER-ALL FRONT	HEIGHT OVER-ALL REAR	WIDTH OVER-ALL FRONT	WIDTH OVER-ALL REAR	DEPTH
T-1M	on-the-wall	1 Table & Steel Cabinet	86 9/16"	—	32¼"	—	5⅛"
T-1F	in-the-wall		"	85⅛"	"	29⅜"	"
T-2M	on-the-wall	2 Tables & Double Depth Steel Cabinet	86 9/16"	—	32¼"	—	10¼"
T-2F	in-the-wall		"	85⅛"	"	29⅜"	"
TB-3M	on-the-wall	1 Table 2 Benches & Steel Cabinet	86 9/16"	—	60¼"	—	5⅛"
TB-3F	in-the-wall		"	85⅛"	"	57⅜"	"
TB-6M	on-the-wall	2 Tables 4 Benches & Double Depth Steel Cabinet	86 9/16"	—	60¼"	—	10¼"
TB-6F	in-the-wall		"	85⅛"	"	57⅜"	"

"F" MODELS SIGNIFY FLANGE TYPE CABINET FOR IN-THE-WALL INSTALLATION. THIS FLANGE OVERLAPS FINISH WALL. "M" MODELS HAVE ENCLOSED MULLION CABINET EDGE FOR INSTALLING PRIMARILY ON-THE-WALL.

ROUGH OPENINGS TO HOUSE FLANGE TYPE CABINETS ARE TO BE:
½" HIGHER THAN "HEIGHT OVER-ALL REAR"
1" WIDER THAN "WIDTH OVER-ALL REAR"
¾" DEEPER THAN "DEPTH"

BOONTON MOLDING COMPANY

Boonton, New Jersey

Boontonware

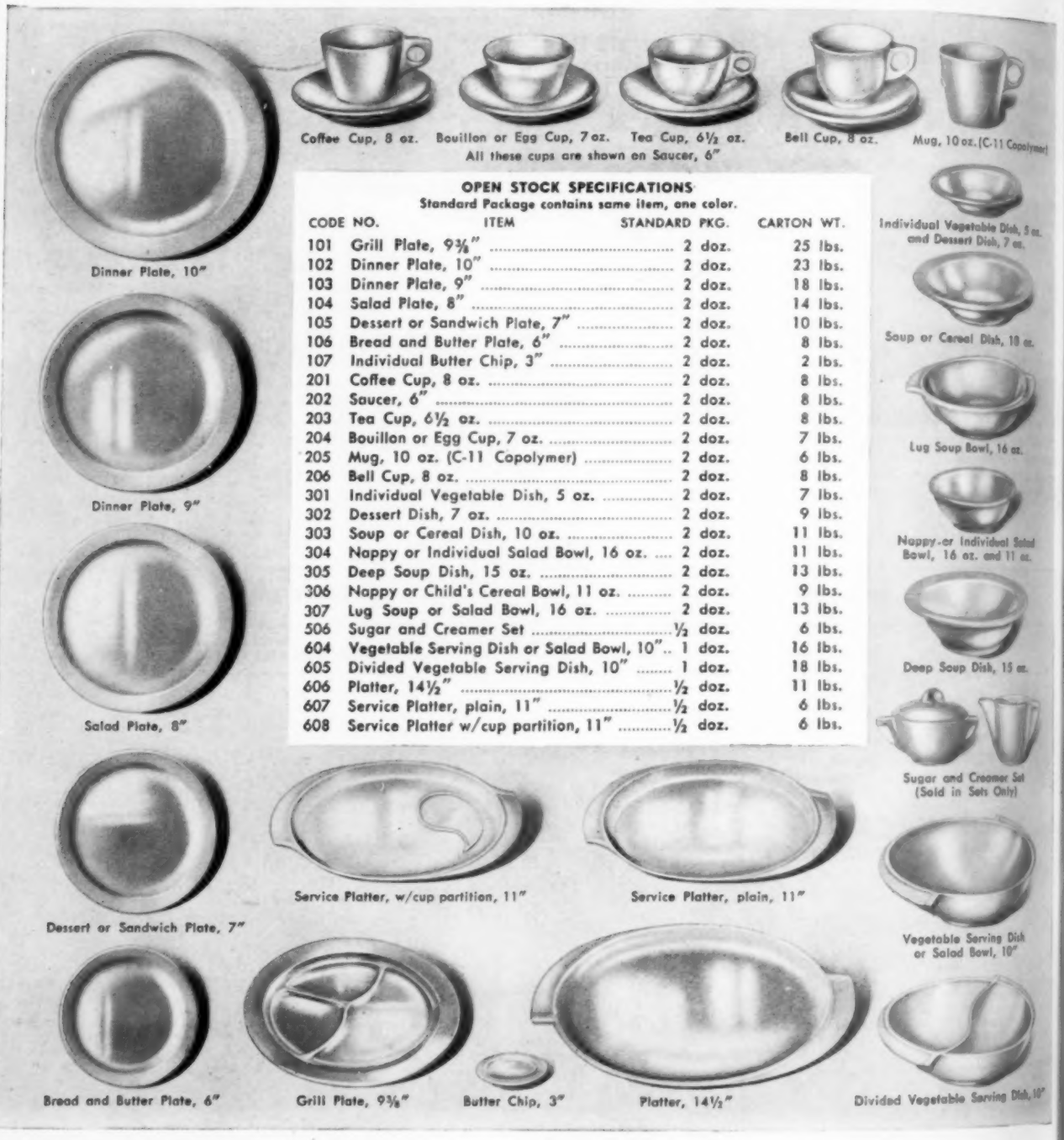
fine dinnerware fashioned of MELMAC®

Solid Colors to Mix or Match

POWDER BLUE GOLDEN YELLOW
SEA FOAM GREEN TAWNY BUFF STONE GRAY
COPPER ROSE FOREST GREEN CRANBERRY RED

PRACTICALLY UNBREAKABLE . . . Saves up to 90% of ordinary replacement costs. Eases the work load; less noisy in use. Enhances food appearance; keeps food hot or cold longer. Impervious to soap, detergents, food acids and boiling water. Stacks perfectly.

See your regular Supply House or write to us for name of your nearest Dealer.



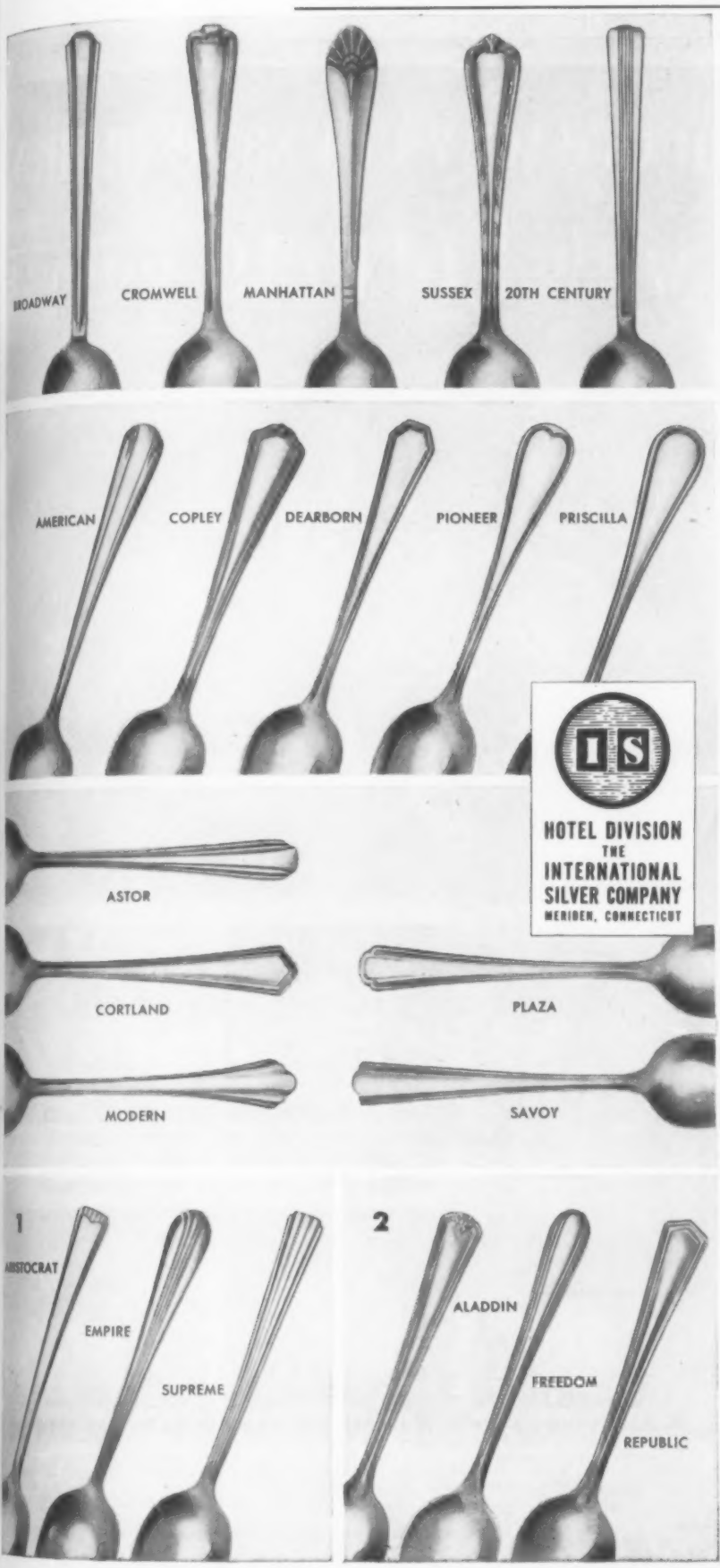
OPEN STOCK SPECIFICATIONS

Standard Package contains same item, one color.

CODE NO.	ITEM	STANDARD PKG.	CARTON WT.
101	Grill Plate, 9⅜"	2 doz.	25 lbs.
102	Dinner Plate, 10"	2 doz.	23 lbs.
103	Dinner Plate, 9"	2 doz.	18 lbs.
104	Salad Plate, 8"	2 doz.	14 lbs.
105	Dessert or Sandwich Plate, 7"	2 doz.	10 lbs.
106	Bread and Butter Plate, 6"	2 doz.	8 lbs.
107	Individual Butter Chip, 3"	2 doz.	2 lbs.
201	Coffee Cup, 8 oz.	2 doz.	8 lbs.
202	Saucer, 6"	2 doz.	8 lbs.
203	Tea Cup, 6½ oz.	2 doz.	8 lbs.
204	Bouillon or Egg Cup, 7 oz.	2 doz.	7 lbs.
205	Mug, 10 oz. (C-11 Copolymer)	2 doz.	6 lbs.
206	Bell Cup, 8 oz.	2 doz.	8 lbs.
301	Individual Vegetable Dish, 5 oz.	2 doz.	7 lbs.
302	Dessert Dish, 7 oz.	2 doz.	9 lbs.
303	Soup or Cereal Dish, 10 oz.	2 doz.	11 lbs.
304	Nappy or Individual Salad Bowl, 16 oz.	2 doz.	11 lbs.
305	Deep Soup Dish, 15 oz.	2 doz.	13 lbs.
306	Nappy or Child's Cereal Bowl, 11 oz.	2 doz.	9 lbs.
307	Lug Soup or Salad Bowl, 16 oz.	2 doz.	13 lbs.
506	Sugar and Creamer Set	½ doz.	6 lbs.
604	Vegetable Serving Dish or Salad Bowl, 10"	1 doz.	16 lbs.
605	Divided Vegetable Serving Dish, 10"	1 doz.	18 lbs.
606	Platter, 14½"	½ doz.	11 lbs.
607	Service Platter, plain, 11"	½ doz.	6 lbs.
608	Service Platter w/cup partition, 11"	½ doz.	6 lbs.

THE INTERNATIONAL SILVER COMPANY

Hotel Division • Meriden, Conn.



Ideal silverware *for every table need*

These quality patterns are a few of the many now available.

INTERNATIONAL SILVER CO.

Extra Heavy Hotel Plate. Preferred by many of America's most distinguished hotels and restaurants; in design, thickness of plate and finish this is the very finest hotel silverplate attainable.

INTERNATIONAL S.CO. XIII TRIPLE

A finer silverplate frequently chosen by better restaurants. Respected for its finer finish, appearance and longer service. It embodies many unusual construction features.

VICTOR S. CO. A1 + OVERLAY IS

The perfect silverplate for the busy restaurants combining maximum serviceability and ease of maintenance at a minimum cost.

SILCO STAINLESS U.S.A.

1. The heavy weight stainless with all surfaces and edges highly polished. Durability and appearance make it the choice of schools, institutions and restaurants.

SILCO STAINLESS U.S.A.

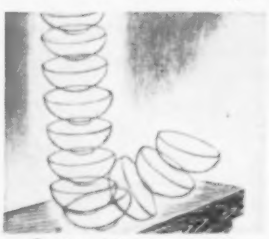
2. The selected low cost, medium weight stainless ideal for fountains and cafeterias. Its many quality features are usually found only in higher priced lines.

CORNING GLASS WORKS

Consumer Products Division
Corning, New York



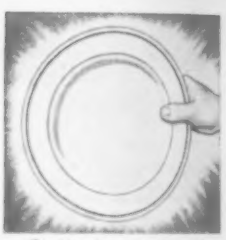
PASSES THESE RUGGED TESTS



1. Double-Tough Ware survives a drop from a height twice as great as other ware.



2. Won't crack or craze from high temperatures in dishwashers, driers or warming ovens.



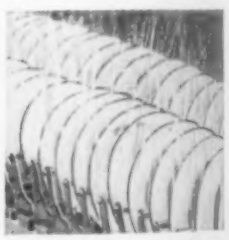
3. Hard, smooth surface goes all the way through. No surface glaze to wear away or scratch.



4. Easier to stack, easier to carry and handle. 20% lighter in weight than competitive ware.



5. Double-Tough Dinnerware can take it! Cups hammer 3-inch nails in board without breaking!



6. The hard, smooth surface of Double-Tough ware washes clean every time—sticky foods wash off easily.

CORNING GLASS WORKS

Consumer Products Division
Corning, New York

on tableware replacement costs TOUGH DINNERWARE!





Mugs stack for easier handling! And the easy-to-grasp handles are an integral part of the cups!

Addition of 3 new items now gives you 9 ways to save!

• Every item here can save you money on tableware replacement costs—over and over again! CORNING Double-Tough Dinnerware is designed to keep its good looks and withstand breakage—no matter how tough you treat it. So why not start cutting down on replacement costs right now? See your equipment dealer for the complete line of CORNING Double-Tough Dinnerware and Tumblers!

SAVE FREIGHT COSTS

Get quick deliveries on orders and re-orders. Order Double-Tough Dinnerware and Double-Tough Tumblers from your nearby CORNING Double-Tough dealer.



Double-Tough Tumblers last 4.3 times longer than standard tumblers. Four styles to choose from. Order them now with new Double-Tough Dinnerware.

Corning DOUBLE-TOUGH Dinnerware and Tumblers

are made by the makers of PYREX BRAND *Ware*

CONSUMER PRODUCTS DIVISION, CORNING GLASS WORKS, CORNING, NEW YORK

"Corning", "Pyrex" and "Double-Tough" are trade-marks in the U.S. of Corning Glass Works, Corning, New York.

KEYES FIBRE SALES CORPORATION

420 Lexington Avenue, New York 17, N. Y.

BEAUTIFUL, ECONOMICAL, DURABLE

KYS-ITE

Reg. U.S. Pat. Off.

PLASTIC TABLEWARE AND SERVING TRAYS

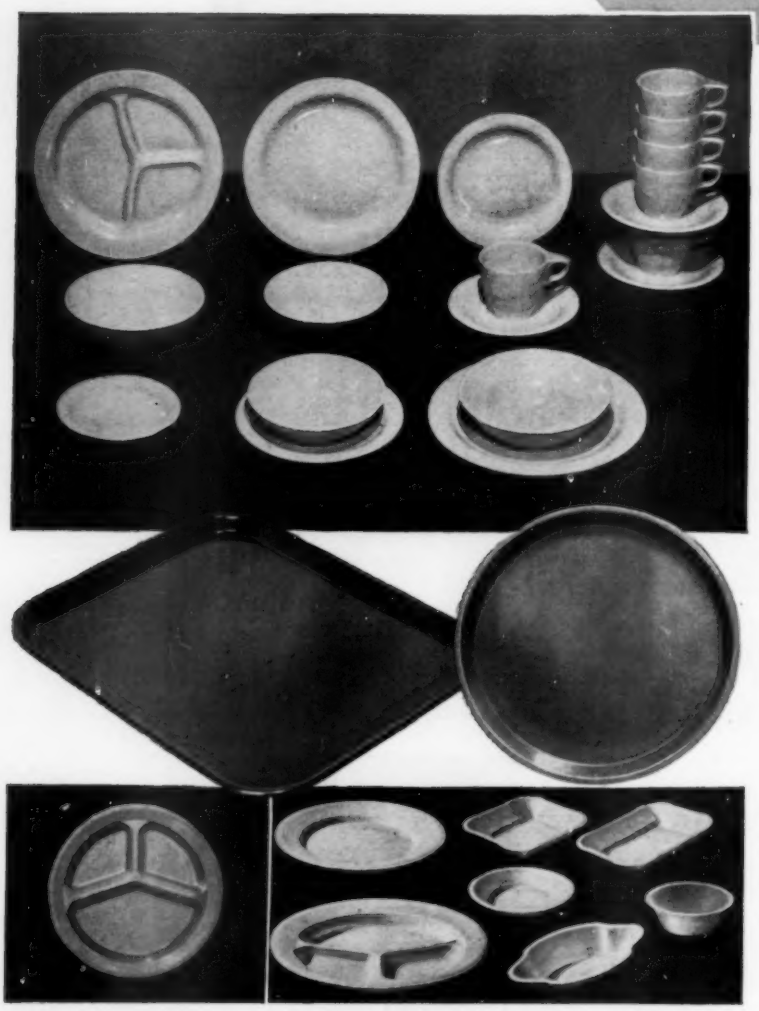
STRONG YET LIGHT . . . in regular usage, KYS-ITE is practically unbreakable . . . resists chipping or cracking . . . but it's light in the users' or dishwashers' hands.

CAN BE STERILIZED IN BOILING WATER . . . unharmed by ordinary washing compounds.

STAYS BEAUTIFUL . . . Color extends through the material . . . not a surface finish that soon wears off.

EASY TO KEEP CLEAN . . . the smooth, hard surface comes clean in a jiffy . . . great time and work saver.

QUIET . . . non-resonant, non-reverberating . . . ends annoying, nerve-straining kitchen clatter.



KYS-ITE PLASTIC TABLEWARE

"Looks like fine china", you'll say. But by using this durable, beautifully designed tableware in place of china, you end continual breakage expense (which runs as high as 100 percent annually on certain items). Figure the saving there and you'll realize it's not long before KYS-ITE has paid for itself.

KYS-ITE PLASTIC TABLEWARE
Attractive Maple Color Only

Code No.	Size	Standard Minimum Package	Wt. Per Standard Min. Pkg.
239	5" Dia. Fruit or Vegetable Dish	6 Doz.	10 Lbs.
232	5½" Dia. 12 oz. Bowl	6 Doz.	17 Lbs.
233	6" Dia. 16 oz. Bowl	6 Doz.	21 Lbs.
236	7" Plate	6 Doz.	16 Lbs.
237	9" Plate	6 Doz.	30 Lbs.
231	11" Dia. 3-Partition Divided Plate	1 Doz.	8 Lbs.
238	9½" Dia. 3-Partition Divided Plate	6 Doz.	35 Lbs.
234	6⅛" Saucer	6 Doz.	13 Lbs.
235	7½ oz. Cup	6 Doz.	19 Lbs.

KYS-ITE PLASTIC SERVING TRAYS
Available in Red or Brown

111	18" x 14" Serving Tray	1 Doz.	25 Lbs.
112	16½" x 12¼" Serving Tray	1 Doz.	18 Lbs.
113	13⅞" x 10¼" Serving Tray	1 Doz.	13 Lbs.
114	20¾" x 15⅛" Serving Tray	1 Doz.	30 Lbs.
115	22" x 16" Serving Tray	1 Doz.	37 Lbs.
116	6½"x4½" Hospital or Change Tray	4 Doz.	13 Lbs.
117	8" x 10" Serving Tray	1 Doz.	7 Lbs.
122	24" x 19¼" Oval Serving Tray	½ Doz.	23 Lbs.
131	11" Dia. Round Serving Tray	1 Doz.	9 Lbs.
132	14" Dia. Round Serving Tray	1 Doz.	15 Lbs.

FOR CHILDREN'S SELF-SERVICE . . . even a tot can tote a full meal (beverage, too) in this lightweight KYS-ITE 3 partition plate. Replaces trays — saves dishwashing and storage space.

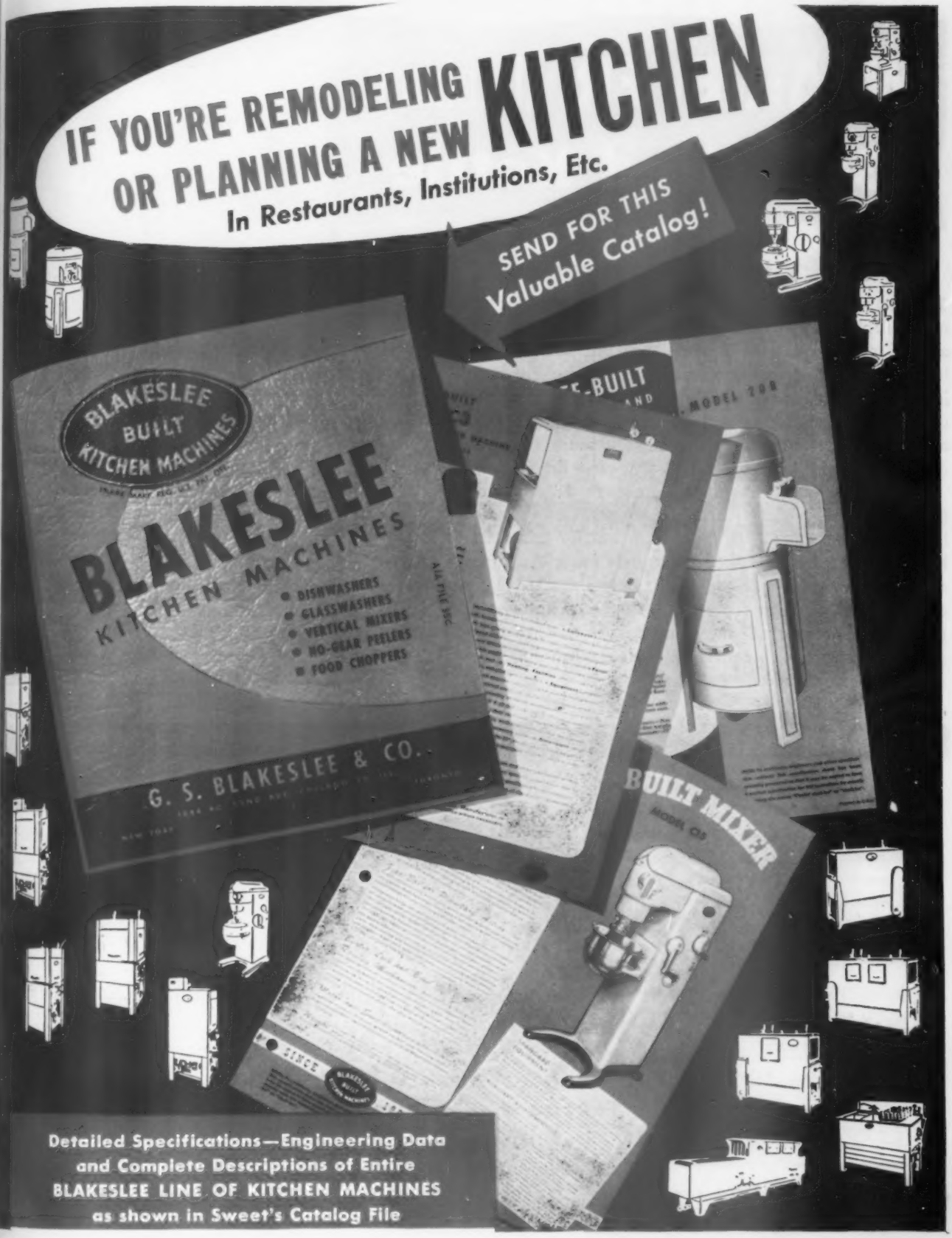
CHI-NET "SINGLE-SERVICE" TABLEWARE AND FOOD CONTAINERS . . . molded from wood pulp, cost so little you can use once and throw away. Hold heavy portions without bending . . . resistant to moist and greasy foods. Good looking, sanitary, convenient—saves dishwashing.

KEYES MOLDED PRODUCTS

Plant at Waterville, Maine

G. S. BLAKESLEE & CO.

1844 South Laramie Avenue, Chicago 50, Illinois
New York • Toronto



THE ALUMINUM COOKING UTENSIL COMPANY

6253 Wear-Ever Bldg., New Kensington, Pa.

WEAR·EVER Aluminum Gas-Fired Kettle



Cooks without steam!

The ideal method to prepare quantities of food when steam is not available. Cooking is done by gas heat applied directly to a heavy gauge seamless aluminum shell. Aluminum spreads heat so rapidly, the entire container does the cooking, assuring perfectly prepared foods. Tangent draw-off and easy-to-clean valve guarantee sanitary protection and make kettle emptying easy. (Kettle insert container also available without draw-off and with lift-out handles.) One-piece hinged cover.

Features a Blodgett Pyrastove burner, specially designed for use with this kettle. Non-cast iron construction eliminates breakage, sand holes, porosity, rough interior mixers and headers; also reduces weight (weighs only about ⅓ as much as equivalent cast iron construction). Burner tips are of low chrome alloy . . . resist corrosion . . . will not clog . . . no maintenance necessary. Burners can operate at less than 10% of maximum input . . . permit fuel savings when only a low temperature is required.

Specifications for Wear-Ever Gas-Fired Kettles

	No. 19010 10 gal.	No. 19020 20 gal.	No. 19030 30 gal.	No. 19040 40 gal.
Height	31⅜	35	36½	38⅞
Diameter of base	25⅛	29⅜	33⅜	35½
Size of draw-off	1½	1½	1½	1½
Floor to draw-off valve	15⅝	15⅝	15⅝	15⅝
Gas inlet I.P.S.	1	1	1	1

STOCK POTS



Two styles, regular and with bibbs (faucets) and strainers. Loop handles, open beads. In 2¼, 3, 4, 5, 6, 7½, 10, 15 and 20 gallon sizes.

Also: Extra heavy duty style in 13 sizes.

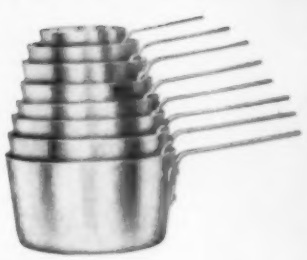
SAUCE POTS



Have open, sanitary beads, loop handles, rounded corners and flat bottoms. Available in 14, 20 and 26 gallon sizes.

Also: Extra heavy duty style in 8 sizes.

SAUCE PANS



Sloping sides, rounded corners, long handles. Nesting sizes as follows: 1½, 2¾, 3¾, 4½, 5½, 7, 8½ and 10 quart sizes.

Also: Extra heavy duty style in 9 sizes.

SEND FOR A COPY OF WEAR-EVER'S CATALOG SHOWING THE COMPLETE LINE

THE ALUMINUM COOKING UTENSIL COMPANY

DOUBLE BOILERS



With flat-bottom inside container. Available in 8¾, 11 and 17½ quart sizes.

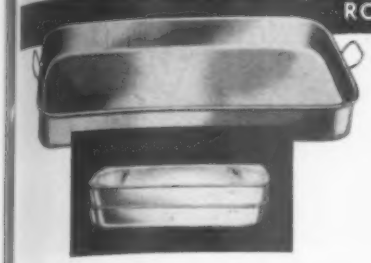


With flat-bottom inside container. Available in 5½ quart size only.



With round-bottom inside container that will stand by itself. In 8, 12 and 20 quart sizes.

ROASTING PANS



SHALLOW TYPE: These shallow Wear-Ever pans are available, if desired, with straps across corners. This permits stacking, as shown in inset. Four sizes. See catalog or your dealer for details.



DEEP TYPE: Equipped with reinforcing steel straps and loop handles. Available with covers as shown in inset. Four sizes. See catalog or your dealer for details.

UTILITY PAN



Ideal for holding table silver, or for use as a refrigerator pan. Has stain-resistant Alumilite finish; open sanitary bead. Available with "slide-on" cover.

SHEET PANS



Rolls and sweet goods baked on these pans have an even texture and color. That's because aluminum absorbs and spreads heat evenly. The superb baking surface is unaffected by moisture or washing. Strong, light. Many sizes in choice of Alumilite or natural finish. See catalog or your dealer for details.

PIE PANS



Absorb and spread heat evenly; produce a golden-brown crust. In Alumilite or natural finish. Top inside diameter 9". Also other styles and sizes.

KITCHEN PANS



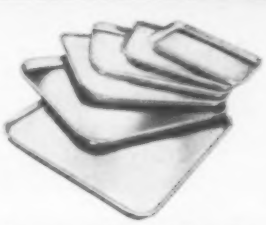
Available in seven nesting sizes as follows: 1½, 2, 3, 4, 5, 6 and 10 quart sizes.

PITCHERS



Light yet strong and dent-resistant. Have cool Bakelite handles as shown, or welded aluminum handles. In 1½, 2½ and 3¼ quart sizes. Also other sizes and styles.

TRAYS



All trays made of Wear-Ever's extra hard aluminum alloy. Your choice of regular or Alumilite finish. Six sizes from 12½" x 9¾" to 22½" x 16 9/16". See catalog or your dealer for details.

PROFESSIONAL CUTLERY

These six knives are commonly used in school kitchens: 2½" cook's paring knife; 3" clip-point paring knife; 6" fruit and salad knife; 8" French cook's knife; 8" clip-point butcher knife; 10" slicer. Made of high-carbon alloy steel specially developed for Wear-Ever cutlery. (On fruit knife and paring knives a special edge-holding, high-carbon stainless steel is used.) Also a complete line of professional cutlery.

Send for complete Professional Cutlery Catalog.



NOW AVAILABLE... Check sheets giving recommended lists of utensils and other equipment for different size cafeterias. Tell us how many you feed and we'll send you the list you need.

S. BLICKMAN, INC.

Manufacturers of Food Service Equipment for Schools and Institutions

3400 Gregory Ave.
Weehawken, N. J.

A 3-Way Service
FOR MASS FEEDING INSTALLATIONS

1 ENGINEERING and LAYOUT: On approved contracts, our service includes related planning, manufacture and installation of complete units. Our engineers evaluate the specific requirements of your mass feeding problem and arrange space and equipment for most effective use of manpower.

2 DESIGN and FABRICATION of INDIVIDUAL UNITS: Blickman engineers carefully design each item to carry out its function efficiently. Our equipment is noted for its welded, crevice-free construction. It is easy to clean, durable and attractive in appearance.

3 THE "KNOW-HOW" IN BUILDING FINE FOOD SERVICE EQUIPMENT: For nearly three-quarters of a century, S. Blickman, Inc. has specialized in the planning and manufacture of food service installations for every need. Our factory is one of the largest in the industry.

your mass feeding installation can serve well for decades!

Whether your new food service equipment will give trouble-free performance for just a few years – *or twenty and more* – depends on how *well* it has been built. You *can* be sure of long years of low-cost maintenance – you *can* cut labor costs–if you select a Blickman-Built installation. Blickman equipment is a sound investment because it is soundly built to assure long service life. Prominent educational institutions throughout the country can attest to this fact. Compare before you buy!

Send for illustrated folder
"Blickman-Built Food Service Equipment"

Blickman-Built
FOOD SERVICE EQUIPMENT

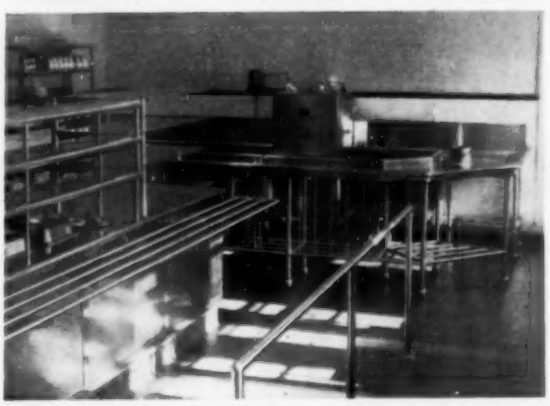


STATLER HALL, CORNELL UNIVERSITY, *Ithaca, N. Y.* — Section of main kitchen, showing stainless steel equipment in pantry. This prominent educational institution emphasizes the scientific approach to hotel and restaurant management. Modern Blickman-Built units were chosen for their sanitary and durable qualities.



UNIVERSITY OF WYOMING
Laramie, Wyo.

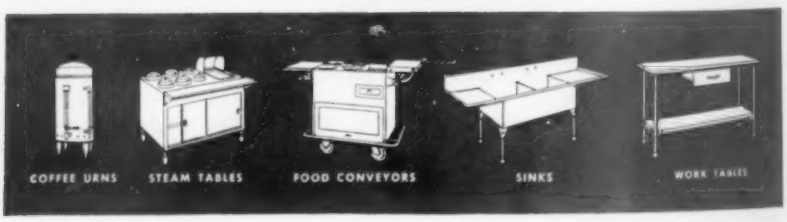
View of all-stainless steel cafeteria counter. This modern university chose stainless steel equipment for both cafeteria and kitchen as best for student feeding and long-range economy. The installation won a "Grand Award" in a recent Institutions Magazine food service contest.*



PHILLIPS-EXETER ACADEMY
Exeter, New Hampshire

Section of stainless steel cafeteria counter at left; stainless steel dish tables in background. This renowned New England school seeks every modern facility for its students. Installations in Dunbar and Webster Halls were selected for long service life and perfect sanitation.

*Blickman-Built installations have won 25 awards in 7 years in the annual Institutions Magazine contests.



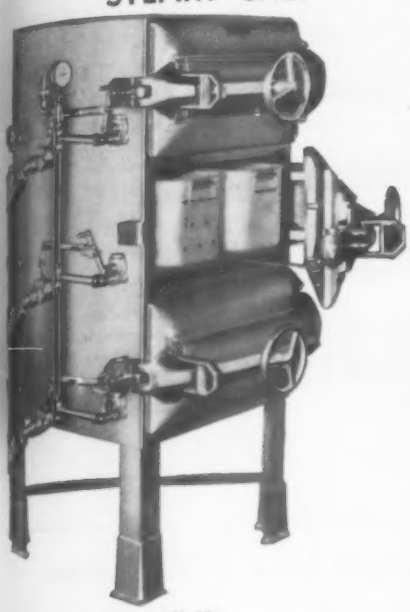
THE CLEVELAND RANGE CO.

3333 Lakeside Ave., Cleveland 14, Ohio

STEAM-CHEF and STEAMCRAFT STEAM COOKERS

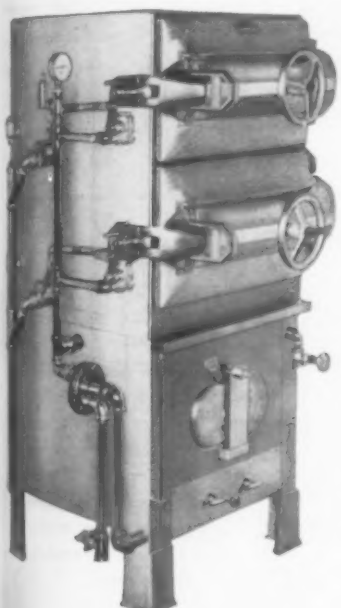
for all School, College and Institution Kitchens. Direct Steam - Gas - Electric Operation

STEAM-CHEF



Model 101-3B

Direct-connected typical 3 compartment style. The most popular size for average requirements. Capacity 6 bushels. For kitchens serving up to approximately 800 persons.



Model 2SB

Steam-generating, gas operated, two compartment. Also available in electric heated or direct-connected type. Capacity 4 bushels. For kitchens serving up to approximately 500 persons.

For 20 years Cleveland Range has produced *Steamers* exclusively. This experience in manufacture and contact with actual users has resulted in such practical and efficient steamers that food service operators continue to buy more and more STEAM-CHEFS and *Steamcrafts*. There are more STEAM-CHEFS in schools, colleges and similar institutions today than all other makes combined.

These steamers are ideal for school kitchens, where the demand is for appetizing, nutritional meals prepared at low cost. They contribute to greater kitchen utility, sanitation and safety, save on labor, food waste and fuel, and provide better cooking results.

STEAM-CHEF heavy duty steamers and Steamcraft for smaller kitchens are available for direct steam, gas or electric operation, in sizes to meet requirements of any kitchen serving 50 or more persons per meal.

Sold through kitchen equipment dealers everywhere. Details and specifications on request—also informative booklet "For Better Steaming."

TYPICAL SCHOOLS and COLLEGES using STEAM-CHEF or Steamcraft

Annapolis, Md.—Bates High School
Big Springs, Texas—Indian School
Birmingham, Ala.—Shades Valley High School
Bossier City, La.—High School
Bryn Mawr, Pa.—Bryn Mawr College
Cambridge, Mass.—Harvard University
Cleveland, Ohio—Lutheran High School
College Station, Texas—A & M College of Texas
Columbia, S.C.—A. C. Moore School
Coral Gables, Fla.—Senior High School
Culver City, Cal.—Farragut School
Dallas, Texas—Southern Methodist University
Decatur, Georgia—Agnes Scott College
Durham, N.C.—Drake University
East Lansing, Mich.—Michigan State College
Evanston, Illinois—Northwestern University
Evansville, Indiana—Harper School
Exeter, N. H.—Exeter Academy
Garden City, Mich.—High School
Groton, Mass.—Groton School
Hanover, N.H.—Dartmouth College
Hudson, Ohio—Western Reserve Academy
Independence, Mo.—Junior High School
Ithaca, N.Y.—Cornell University
Jackson, Miss.—Forest Hill School
Lafayette, Ind.—Purdue University
La Grange, Ill.—Nazareth Academy
Lexington, Va.—Virginia Military Institute
Memphis, Tenn.—Park School
Middletown, Ky.—Eastern High School
Mooresville, N.C.—High School
New Haven, Conn.—Yale University
New York, N.Y.—Barnard College
New York, N.Y.—Fordham University
New York, N.Y.—Hunter College
Palo City, Cal.—Stanford University
Poughkeepsie, N.Y.—Vassar College
Princeton, N.J.—Princeton University
Providence, R.I.—Brown University
Saratoga Springs, N.Y.—Skidmore College
Sodus, N.Y.—Central School
Syracuse, N.Y.—Syracuse University
Tulsa, Oklahoma—Webster School
Tucson, Arizona—High School
Vermillion, S.D.—University of South Dakota
Wallingford, Conn.—The Choate School
Wellesley, Mass.—Wellesley College
Westfield, N.J.—High School
Yakima, Wash.—St. Paul's School

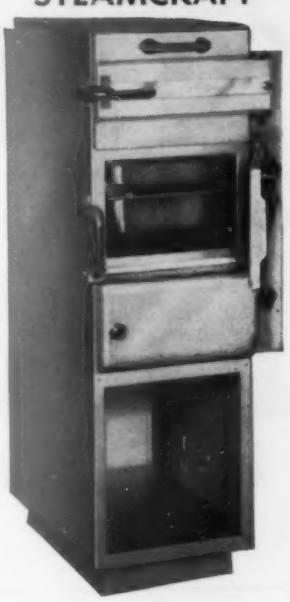
ALSO STATE UNIVERSITIES OF

Arkansas	Iowa	Montana	Pennsylvania
California	Kansas	Nebraska	S. Carolina
Colorado	Kentucky	N. Hampshire	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	N. Carolina	Vermont
Georgia	Michigan	Ohio	Virginia
Idaho	Minnesota	Oklahoma	Washington
Illinois	Missouri	Oregon	Wisconsin
Indiana			Wyoming

STEAM-CHEF FOR HEAVY DUTY

Steamcraft FOR SMALLER KITCHENS

STEAMCRAFT



2 compartment Steamcraft on base. Holds 6 regular 12" x 20" x 2½" pans.



1 compartment Steamcraft counter model. Takes only a 22" space, holds 3 cafeteria pans. Base optional. Send for Steamcraft folder.

THE COLSON CORPORATION

Home Office and Factory: Cedar Street, Elyria, Ohio

Representatives in Principal Cities

Manufacturers of Dish Trucks, Tray Trucks, Book Trucks, Maids' Trucks, Mop Trucks, Linen Hampers and Casters for every Institutional Requirement

COLSON Model 10-6406-6

Stainless Steel Dish Trucks



Attractively styled and sturdy enough for many years of smooth quiet service. Frame is 1¼" tubular stainless steel; shelves are 16 gauge type 302 stainless steel. Heavy duty rubber bumper protects truck and walls. Front wheels — 10" diameter; rear wheels 5"—all have replaceable cushion rubber tires and ball bearing hubs for fast, quiet operation.

COLSON Model 10-6332

Stainless Steel Tray Trucks



Each shelf has embossed recessed panel —no danger of sliding trays or dishes onto the floor. Rubber bumpers protect walls and other equipment as well as the truck itself. Wheels are 8" diameter with demountable cushion rubber tires.

COLSON Model 6529 Mop Trucks



Tank capacities from 8¼ to 60 gallons. All joints welded and soldered watertight. Tank bottoms slope downward towards drip-proof brass drain valves. Ball bearing, rubber-tired wheels insure fast, quiet operation.

COLSON Model 6571 Maids' Trucks



This easy-rolling, easy-turning maids' truck is ideal for institutional housekeeping. Chassis has deck to carry mop buckets, sweepers, etc. Bag holders of heavy flat steel provide convenient push handles. Rubber bumper surrounds the truck, providing complete protection to walls and furniture.

COLSON CASTERS FOR EVERY INSTITUTIONAL NEED

Model 3-1013-74 for use with tray or dish trucks or wherever a positive wheel brake is required. Double steel disc wheels have demountable cushion rubber or semi-pneumatic tires. Available in 8" and 10" wheel diameters.





Model 1-3055-42 for metal furniture and rolling equipment. Equipped with universal metal expansion adapters these casters are ideal for replacing worn, hard rolling casters on all kinds of lightweight equipment with tubular legs. Available in 1⅝", 2" or 3" diameters.

Model 1-1652-31 for beds, chairs, bureaus—all kinds of wood and metal furniture. Colson bed casters prevent scratching and gouging of floor surfaces. Full ball bearing swivel construction, hardened bearing surfaces and oversized stems assures many years of trouble-free service.



CRESCENT METAL PRODUCTS, INC.

18901 St. Clair Avenue, Cleveland 10, Ohio

ORIGINATORS OF CORRUGATED-WALL, MULTIPLE-PAN, ALUMINUM *CRES-COR* FOOD HANDLING EQUIPMENT

Through many years' experience, Crescent has developed a product for virtually every standard food item and for various stages of its processing and movement to point of sale or use. The Crescent Line includes hand lift cabinets, cabinets on wheels, open racks, proof cabinets, hot cabinets, cold cabinets, tray racks, food conveyors, dollies, assorted pans, accessories.

Crescent offers integrated systems of equipment to meet the entire food handling cycle at any establishment. Your food pans are the foundation of the Crescent System. They form the shelves in each Cres-Cor Unit you buy. Pans are interchangeable between units.

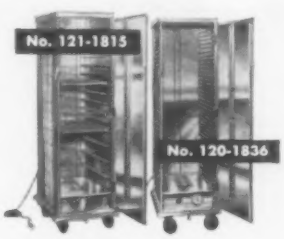
Where application dictates the use of custom-built equipment, Crescent is equipped to handle this also. We will work with your operating personnel or engineers in developing design, method of fabrication, delivery schedules, etc.

FREE 30-DAY TRIAL OFFER. Compare at our expense. We will ship you any standard unit from the line of Cres-Cor Food Handling Equipment for a 30-day free trial period—at no cost—at no obligation.

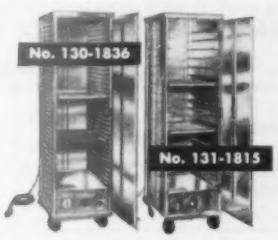
A-128



CRES-COR UTILITY CABINETS For both transporting and storing foods where conditions require a closed container.



CRES-COR PROOF CABINETS For proofing small batches of baked goods where "individually baked" flavor is desired.



CRES-COR HOT AND COLD CABINETS For keeping hot foods hot and cold foods cold from preparation to time of serving.



CRES-COR UTILITY RACKS (corrugated) For tailoring your storage space to the job on hand. Here's mobility and shelf flexibility in one unit.



CRES-COR FOOD CONVEYORS Self-contained, mobile kitchens for transporting complete meals from a central kitchen to a serving area.



CRES-COR UTILITY RACKS (angle-ledge) Angle-ledge models are available for those applications where width of pan varies somewhat.



CRES-COR UTILITY RACKS (multiple unit) These models are for use where greater storage capacity is needed in a single unit.



CRES-COR GLASS RACK DOLLIES For transporting glass racks from dishwasher to serving area and back again.



CRES-COR TRAY CARTS For those countless miscellaneous light-duty toting jobs in and around the kitchen.

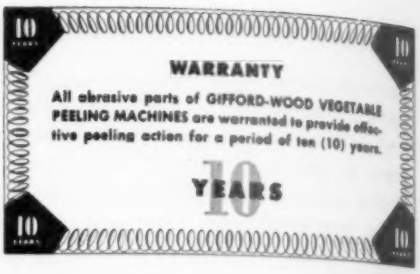
GIFFORD-WOOD CO.

Hudson, New York

GIFFORD-WOOD VEGETABLE PEELING MACHINES

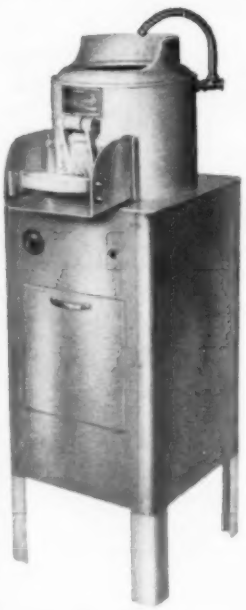
WARRANTED FOR TEN YEARS

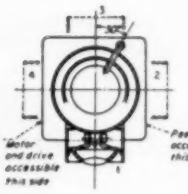
This 10-year warranty is based on the special G-W *Cast-in-Carborundum* process used on all abrasive parts. Vegetables can be peeled with only 5% to 10% peeling loss, and can be discharged during peeling operation. Peel traps provided on all units to comply with municipal ordinances.



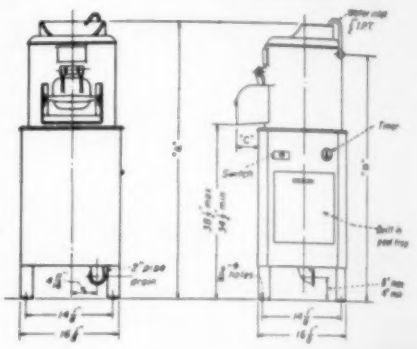
G-W "ROYAL"

In 2 capacities: 15 lb. and 30 lb. Features include: automatic shut-off timer; discharge in any direction; multi-directional drain; built-in peel-trap; constant-tension drive; sink-height construction (for either 34 or 38-inch height sinks); leak-proof door with "D" handle and wedge-lock latch; attractive, functional cabinet; and corrosion-resistant base paint with hard-gloss enamel finish—or stainless steel. Both models have manual starting switch with overload protection, and are listed with Underwriters' Laboratories, Inc.





DIM	20-R MAX	20-R MIN	30-R MAX	30-R MIN
A	52⅛	48⅛	55⅛	51⅛
B	47⅛	43⅛	50⅛	46⅛
C	3½		3⅝	

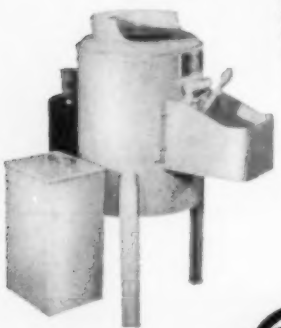


SPECIFICATIONS

MODEL	CAPACITY IN 45-60 SEC.	MOTOR BALL BEARING VENTILATED
20-R	15 lb.	¼ hp.
30-R	30 lb.	½ hp.

In order to meet Federal Spec. 00-M-106, G-W Peelers were subjected to the "accelerated life" test of operating continuously for eight hours with the cylinder half-full of 2" hard maple blocks. After *thirteen* runs of this test (104 hours) in the same cylinder, the blocks had been reduced to golf-ball size, but there was no sign of wear on G-W's exclusive *Cast-in-Carborundum* surfaces.

G-W "SUPERIOR"



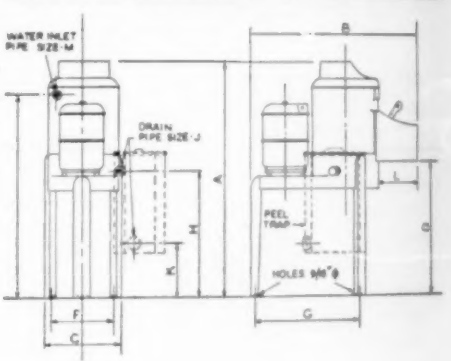
Designed to Federal Specification 00-M-106 for use by military services and other unusually heavy-duty installations. Features include: shielded constant-tension drive; attached peel trap; gasketed leak-proof door; and corrosion-resistant base paint with hard-gloss enamel finish. Listed with Underwriters' Laboratories, Inc.

SPECIFICATIONS

MODEL	CAPACITY IN 45-60 SEC.	MOTOR BALL BEARING DRIP-PROOF VENT
20-A	15 lb.	⅓ hp.
30-A	30 lb.	½ hp.
50-A	50 lb.	¾ hp.

DIMENSIONS

Model No.	A	B	C	D	E	F	G	H	J	K	L	M
20-A	34¼"	31⅛"	15"	21⅜"	31⅝"	11½"	19"	19⅛"	2"	8⅝"	8⅝"	½"
30-A	41"	36"	16¼"	22½"	35⅝"	13¼"	21¼"	20⅛"	2"	9¼"	10⅝"	½"
50-A	46"	40"	19½"	22⅞"	38½"	16¼"	23"	20⅛"	3"	7⅞"	17⅝"	⅝"



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Since 1814
Hudson, New York

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PASS-THRU CABINETS

Designed for installation in the wall between dining room and kitchen with access from either room. Ideal for storage of salads and other prepared foods. Available in 3 models: 6, 9, and 12 doors with 50, 75, and 105 cu. ft. capacities.



DRY BEVERAGE COOLERS

7 MODELS — REMOTE & SELF-CONTAINED

PUFFER-HUBBARD *Lifetime* REFRIGERATORS

IN PORCELAIN ENAMEL OR STAINLESS STEEL FINISH

Year after year, more and more Schools, Universities and other Institutions are turning to America's finest quality commercial refrigerators . . . the Puffer-Hubbard Line. The reason for this swing to "P-H" equipment is that for efficiency, lowest operating and maintenance cost, and long life service, it pays to buy the Very Best! Whatever your food service refrigeration requirements may be, it will be well worth your while to investigate these famous "P-H" *Lifetime* Features! Genuine Porcelain or Stainless Steel Finish . . . Patented "Grad-U-Matic" Air Conditioning . . . Sag-Proof Door Construction . . . Tubular Electric-Welded Steel Frames . . . Heavy Fiberglass Insulation . . . Solid or Triple Thermopane Doors . . . Automatic Self-Defrosting Freezing System . . . Underwriters Approved.

The Complete "P-H" Line also includes Walk-in Coolers and Freezers, Dough Retarders, Baker's Freezers and Dairy-Delicatessen Cases.



REACH-IN CABINETS

Available in models 20 to 90 cu. ft. capacities . . . 2 to 8 doors . . . self-contained or remote . . . choice of Porcelain Enamel or Stainless Steel finish.

THE MARK OF A GOOD CASE — THE P-H LINE — ESTABLISHED 1898



UPRIGHT STORAGE FREEZERS

Available in 3 models . . . 40, 59 and 87 cu. ft. capacities . . . 4, 6, and 8 doors . . . choice of adjustable shelves or tray racks.

See YOUR NEAREST "P-H" DEALER, OR ***Write*** **TODAY** FOR ILLUSTRATED LITERATURE!

SEDGWICK MACHINE WORKS

Manufacturers of Dumb Waiters and Elevators

156 West 15th Street, New York 11, N. Y.

The Maximum in Safety . . . The Ultimate in Economy — Since 1893

Nationwide Representation

General

Sedgwick Dumb Waiters and Elevators are products of specialization since 1893 in school and college installations throughout the country. Numerous types, sizes and capacities are available to meet different requirements and conditions. The main uses are briefly described below.

Food Service

Food supplies, dishes, and other cafeteria, lunch room, dining hall and kitchen loads are quickly and conveniently handled from floor to floor by means of SEDGWICK Electric Dumb Waiters or SEDGWICK Hand Power Dumb Waiters, depending on the individual requirements of service frequency, loads to be handled, and height of travel.

Library Service

Books can be sent without undue effort to the required stack levels or raised from basement storage space as required for distribution by using SEDGWICK Electric Dumb Waiters or SEDGWICK Hand Power Dumb Waiters.

Classroom Service

Books, stationery, crackers-and-milk lunches and general school supplies are systematically sent up or down by SEDGWICK Dumb Waiters without obstructing stairways with the handling of such loads. Electric or manual operation should be determined according to specific duty required.

Dormitory Service

Furniture, trunks, laundry hampers and other bulky and heavy loads are carried from floor to floor by SEDGWICK Hand Power Freight Elevators or SEDGWICK Hand Power Dumb Waiters used as trunk lifts.

Laboratory Service

Supplies and apparatus are safely and easily carried from storage or receiving room to laboratory floors above by SEDGWICK Electric or Hand Power Dumb Waiters conveniently located to save time and effort.

Laundry Service

Laundry hampers and trucks are carried in many laundry buildings on SEDGWICK Electric Dumb Waiters, SEDGWICK Hand Power Dumb Waiters or Freight Elevators.

Doors

SEDGWICK Steel Dumb Waiter Doors and Frames are designed to give dependable service in all of the previously mentioned applications. Doors are built in various types—bi-parting, single section slide-up or slide-down, or hinged, as desired. Access doors for machine space or clean-out are usually supplied. Approved Underwriters' Labelled construction is followed where called for.

Infirmary Service

The SEDGWICK Hand Power Hospital Elevator provides an economical and unfailing means of carrying patient on stretcher or bed. Meal trays are handled by SEDGWICK Electric or Hand Power Dumb Waiters.

Consultation

Our experience gained from many thousands of installations should be used in planning to best advantage installations of dumb waiters and elevators in school and college buildings. Write or telephone us for recommendations, layouts and specifications which will be gladly submitted at once.

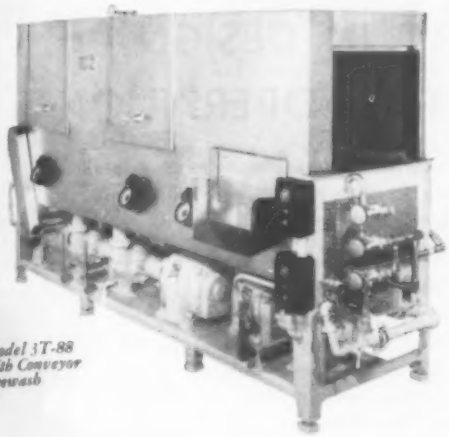


"SEDGWICK Electric Dumb Waiter in Food Service"

TOLEDO SCALE COMPANY

Toledo 1, Ohio

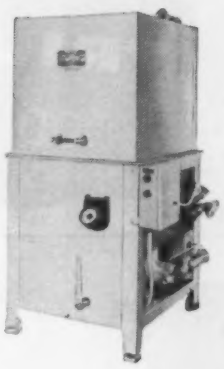
Save Time...Control Costs with TOLEDO®



Model 3T-88 with Conveyor Prewash

√ DISHWASHERS

Performance-proved Toledo Dishwashers, both door-type and automatic conveyor machines. Wide choice of sizes and capacities ranging from single tank manual door models handling 850 dishes per hour . . . up to heavy-duty three-tank machines capable of averaging 11,400 dishes per hour. Also available—new Combination Dishwashers with conveyor pre-wash—combining pre-wash, wash and rinse in a single automatic-conveyor machine.



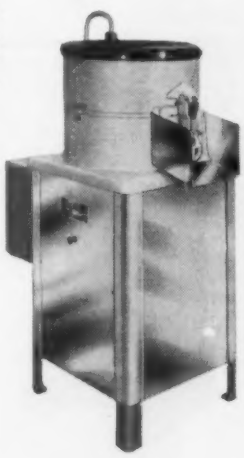
Model DS-27 Door Type

√ CHECK YOUR NEEDS!

Today—famous Toledo precision can help you attain top efficiency in a wide range of kitchen operations in schools and universities. Modern Toledo Dishwashers and Food Machines are available in a complete selection of types and capacities. Also—Toledo Receiving and Portion Scales enable you to accurately weigh it in . . . weigh it out . . . to control costs. Write for bulletin 100-J.

√ PEELERS

Your choice — 10 models! Toledo Double Action Peelers are speedy, efficient . . . with peeling achieved by sharp abrasive on both disc and cylinder. Uniform "skin deep" peeling with minimum of waste. Built-in peel trap empties direct to waste can. Easy to clean and keep clean. Full rated capacity is peeled in 1 to 1¼ minutes.

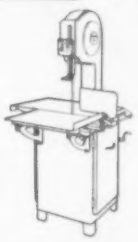




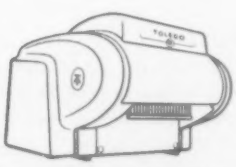
√ SLICERS



√ CHOPPERS



√ SAWS



√ STEAK MACHINES



√ RECEIVING SCALES

Model 2181 Portable Scale with Adjustable Wheeled Stand and Packing House Pan. Excellent for weighing in meats, produce and other food items. Other Toledos include floor scales, overhead track scales, automatic laboratory scales . . . a complete selection all the way up to motor truck scales.



√ PORTION SCALES

Toledo Speedweigh Model 3011 Over-Under Scale for weighing portions and ingredients in kitchens and other uses. Provides new speed with high accuracy . . . sensitive to 1/64 of an ounce. Shadow-free, wide-angle reading.



√ MAILING and PARCEL POST SCALES . . .

Model 419 to 3 lb. Easy to read . . . accurate computing. Parcel post models to 70 lb.

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TRIUMPH FOOD MIXERS

SANITARY IN DESIGN EFFICIENT IN OPERATION

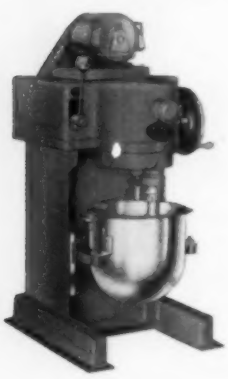
Over fifty years experience as specialists in food mixer design goes into every Triumph Food Mixer. All Triumph Mixers are easy to clean, keep clean.



For the "N" 20 Bench Mixer several types of metal tables or benches are available. Such tables when mounted on casters enable the mixer to be moved to any location.

Type "N" 20 Quart Mixer features a tilted beater and tilted bowl. You get the same effect as hand whipping. Power Take-Off on side. Variable speed allows speed change instantly without stopping. Single lever control requires use of only one hand in operating.

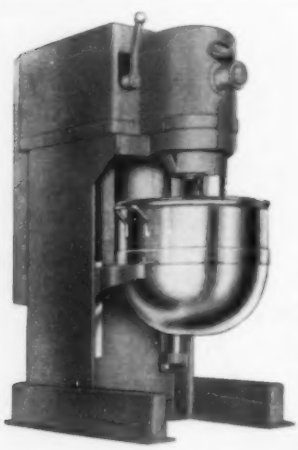




Type "LI" 60 Quart Mixer is a medium sized mixer at a popular price. It readily meets all requirements of speed, production and versatility. The "LI" 60 features syncromesh transmission with all gears running in a bath of oil. Gear teeth are in constant mesh actuated by positive clutches. Speed can be changed at will by One Hand Control Lever without fear of damaging gear teeth through improper manipulation.

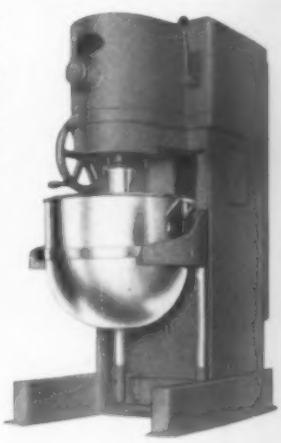
Type "M" 30 Quart Mixer is a small type floor model mixer that meets all requirements for speed, production and versatility. The three speed selective transmission is operated by One Hand Control Lever.





Type "KI" 80 Quart Heavy Duty Mixer is a rugged four speed mixer that will help you increase your production while cutting your production cost. One Hand Control Lever allows quick changing of speeds while the machine is running. Syncromesh transmission with all gears running in an oil bath prevents gear teeth damage through improper manipulation.

Type "LI" 80 Quart Mixer is a sturdy, well balanced, three speed machine, remarkably free from vibration. The "LI" 80 is designed to give years of efficient service with extremely low maintenance cost. It also features syncromesh transmission and the 3 speeds that can be changed by One Hand Control Lever while the machine is in operation.

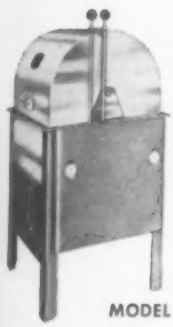


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45 Windsor Place, Nutley 10, New Jersey

Only *Universal* offers all these great dishwashing improvements

Your Choice of 31 Quality Models of *advanced design* for every dishwashing need



MODEL D

One tank, straight through, roll top. Floor space 24" x 24". 1,250 dishes per hour. Motor ½ h.p. with two power wash. Wash tank capacity 15 gal.; pump capacity 100 gal. Four 20" x 20" racks.



MODEL GB2

Double brush glass scrub unit to mount in dishtable ahead of dishwasher. Capacity 2,000 glasses per hour.



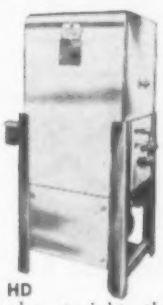
MODEL TA3

Three tank immersion dishwasher. First tank, pre-scrap; second tank, power wash and third tank final immersion rinse, with additional foot lever operated fresh water spray. Floor space 67" x 25". Capacity 3,500 pieces (80 baskets) per hour.

Your choice of SWING WASH

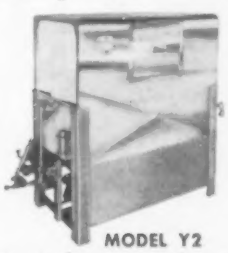
- STATIONARY WASH
- REVOLVING WASH

You get the BEST water pattern for your washing job.



MODEL HD

One tank, straight through (doors). Floor space 26" x 24". 1,250 dishes per hour. Motor ¾ h.p. Wash tank capacity 15 gal.; pump capacity 140 gal. Four 18" x 18" racks. Also available as Model HDC for corner operation.

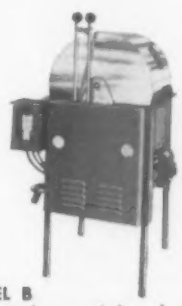


MODEL Y2

One tank, automatic pawl conveyor with swing-wash. Floor space 28" x 46½". 3,750 dishes per hour. Two motors control a separate wash and rinse action. Wash tank capacity 38 gal.; pump capacity 250 gal. Seven 20" x 20" racks.

Write for complete catalogue Today

Your choice of electric, gas or steam operated **BOOSTERS** can be built right into Universal Dishwashing Machines. Meets Health Department requirements. Requires no extra plumbing. Saves installation cost.



MODEL B

One tank, straight through, standard height roll top. Floor space 20" x 20". 625 dishes per hour. Motor ⅓ h.p. Equipped with electric timed wash and rinse control. Special high hoods available for 10½" plates.



MODEL MM3

Two tanks, automatic pawl conveyor (curtains). Floor space 28" x 70½". 5,000 dishes per hour. Two 1 h.p. motors for separate power wash and rinse. ⅓ h.p. motor controls conveyor and final rinse. All motors vee belt connected.

For 180° Rinse



MODEL M

combines HYDRAULIC-TIMED WASH AND RINSE CONTROL, 180° GAS FIRED RINSE WATER BOOSTER AND SWING WASH IN ONE UNIT.

One tank, straight through (doors). Floor space 28" x 30". 2,000 dishes per hour. Motor 1 h.p. Wash tank capacity 25 gal.; pump capacity 180 gal. Five 20" x 20" racks. Also available as Model E for corner operation.



MODEL S

One tank, straight through or corner, three doors. Floor space 30" x 29½". 1 h.p. motor. All doors interlock with single lever control. Revolving wash and rinse action. Five 20" x 20" racks.

Universal DISHWASHING MACHINERY CO.

COMMERCIAL TYPE UNIVERSAL DISHWASHERS

45 Windsor Place, Nutley 10, N. J.

WORLD'S LARGEST *Exclusive* PRODUCER OF COMMERCIAL TYPE DISH, GLASS AND SILVER WASHING MACHINES

The most important equipment for the heart of the dishwashing system

UNIVERSAL INDUSTRIES

374 Mystic Ave., Somerville 45, Mass.

THE NEW UNIVEX All-Purpose 20 lb. VEGETABLE PEELER



Fast, efficient, silent, automatic — this miracle peeler changes the slowest kitchen operation into the fastest!

MODEL D

$139.95



Cost of Mobile Stand **$49.50**

Removes less than 10% of the vegetable — including skin — retaining full vitamin content.

- FULL LOAD PEELED IN JUST 1 MINUTE
- POWERFUL ⅓ HP MOTOR WITH OVERLOAD PROTECTION
- PORTABLE — USE ANYWHERE — JUST PLUG IT IN
- UNCONDITIONAL 2-YEAR GUARANTEE OF PEELING DISK
- AUTOMATIC TIMER AND DELIVERY CHUTE — NO WASTE

Capacity 20 lbs.; Height 21"; Delivery Chute 3"; Diameter 15"

The NEW UNIVEX Bench Type 22 Qt. Portable FOOD MIXER

Model 1222

$339.50





⅓ HP MOTOR

- PRE-SELECTOR FOR CONTROLLED MIXING
- PLANETARY ACTION WITH VARIABLE SPEED CONTROLS
- SIMPLIFIED TRANSMISSION HEAD — LESS PARTS
- BALL-BEARING OPERATION AT ALL VITAL MOVING PARTS
- POWER TAKE-OFF FOR CHOPPERS, SHREDDERS, ETC.

Over-all Dimensions of Mixer: Width 17¾"; Height: 26"; Depth: 29"; Weight: 240 lbs. (Shipping Wt. 275 lbs.)

Cost of Mixer Stand **$49.50**

AND HERE ARE MORE COST-CUTTING, PROFIT-BUILDING PRODUCTS

ECONOMY PORTABLE MODEL MODEL C $107.50



- Peeling capacity, 20 lbs.
- Dial Control Standard
- Automatic Timer
- Ball-bearing ¼-hp motor
- Manual Delivery

STANDARD BEATERS	22qt.	12qt.
Mixer Bowl	22.00	18.00
Extension Ring	14.00	13.00
Splash Cover	10.00	9.00
Wire Beater	18.00	17.00
Batter Beater	10.00	9.00
4-Wing Wr. Beater	20.00	19.00
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Pastry Knife	10.00	9.00
Dough Hook	8.00	7.00

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Fr. Fry Plate & Julienne Plate	39.00 ea.
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(Makes other attachments fit Univex)

Special Univex Power Take-Off Adaptor 16.00

Specify manufacturer of your attachments when ordering adaptor

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Cost Less Than Others . . . Do More Than Others

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...the best way to handle a young army!

The table tops and the front of the serving counter of St. Joseph's High School Cafeteria in Cleveland are surfaced with lustrous lifetime MICARTA®. Sliding dishes, grease, liquids and the year-after-year wear of young, boisterous diners have no effect on MICARTA'S smooth, super-tough surface. That's why it was specified by Architects Stickle, Kelly and Stickle.

In other places in the school, too, MICARTA offers trouble-free surfaces for generations of scrapers and scuffers. Desk tops, work counters, wainscoting and furniture surfaced with MICARTA will continue to give service long after conventional materials have succumbed to vigorous wear.

Whether you are building or remodeling consider MICARTA. Investigate the economy and efficiency of finishing hard-wearing surfaces with colorful stainproof MICARTA. For full information on applications in schools, call your nearest United States Plywood office.

J-06484

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food service equipment leaders since 1847

● Ever since its establishment in 1847 The John Van Range Company has specialized in designing and fabricating food service equipment for public and private schools and colleges.

● The first portable steel range in the world was the invention of the founder of this company. Carrying on, his successors have pioneered in developing new and improved equipment, spearheading advances in the science of mass feeding.

● When you see an unusually fine food service installation, you will undoubtedly find Van's name plate on the equipment.

● **If you are planning food service equipment improvements, make use of Van's century of experience.** Write today for new Van book showing illustrations of installations in all types of institutions.

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Purdue University .....Lafayette, Indiana
University of Cincinnati .....Cincinnati, Ohio
Hanover College .....Hanover, Indiana
Holmes High School .....Covington, Kentucky
St. Joseph College .....Rensselaer, Indiana
Hebrew Union College .....Cincinnati, Ohio
Boston Public Schools .....Boston, Massachusetts
De Pauw University .....Greencastle, Indiana
North Carolina State College .....Raleigh, North Carolina
Holy Cross College .....Worcester, Massachusetts
Withrow High School .....Cincinnati, Ohio
University of Oklahoma .....Norman, Oklahoma
Sweet Briar College .....Sweet Briar, Virginia
University of Kentucky .....Lexington, Kentucky
University of Texas .....Austin, Texas
Instituto de la Ciudad University .....Caracas, Venezuela
Marshall College .....Huntington, West Virginia
Oklahoma A & M College .....Stillwater, Oklahoma
Jefferson School .....Hamilton, Ohio
High School, U. S. Atomic Energy Com..Oak Ridge, Tennessee
Ohio State University .....Columbus, Ohio
Providence College .....Providence, Rhode Island
Wittenberg College .....Springfield, Ohio
University of West Virginia ....Morgantown, West Virginia
Hiram College .....Hiram, Ohio
University of South Carolina .....Columbia, South Carolina
University of Tennessee .....Knoxville, Tennessee
Miami University .....Oxford, Ohio
Xavier University .....Cincinnati, Ohio

E c/1



It costs less than you think to go modern...

Stay modern with

General Electric



MODERN with General Electric at *low initial cost* on the special Homemaking Classroom Plan.



STAY MODERN with General Electric at *no cost*, subject to the provisions of the special G-E Model Replacement Plan.

Like to know MORE about it?

GENERAL ELECTRIC

APPLIANCE INSTALLATION AGREEMENT WITH EDUCATIONAL INSTITUTIONS

An agreement to install General Electric Household Appliances in Domestic Science and Home Economics Departments of Educational Institutions for instructional purposes.

THIS AGREEMENT IS MADE BY AND BETWEEN

_____ (Dealer or Distributor) _____ (City) _____ (State)

AND

_____ (Educational Institution) _____ (City) _____ (State)

The Dealer or Distributor agrees to sell and the Educational Institution agrees to buy General Electric Household Appliances, at a special accredited Educational Institution price as follows:

Quantity	Product	Model	Price

The above price includes delivery and installation to existing wiring and plumbing, but if special wiring and plumbing are required, it must be done at the expense of the Educational Institution. The price also includes any service required to maintain the above-described appliances in good operating condition for one year except for repairs caused by breakage or replacement due to negligence of the user.

The Educational Institution agrees that the appliances covered by this agreement are to be used only for instructional purposes in Domestic Science or Home Economics Departments.

If the Educational Institution is legally entitled to purchase on a tax-free basis products subject to a Federal Excise Tax, the Dealer or Distributor will, upon receipt from the Educational Institution of the original copy of a properly executed Federal Excise Tax Exemption Certificate as required by the Bureau of Internal Revenue, submit the certificate through the usual channels to the Manufacturer. Any resulting tax credits will be refunded to the school.

The Distributor or Dealer further agrees that he will replace the above-described appliances (excluding Kitchen Cabinets) with comparable new models as they are released. The replacement will be made at the option of the Educational Institution. The replacement will be made at no additional cost to the Educational Institution providing the above-described appliances are in good condition, normal wear and tear excepted, and the request for replacement is made within 18 months from the date of original installation. Any additional wiring or plumbing expense involved in connection with the replacement will be paid by the Educational Institution.

The Educational Institution shall be responsible for normal care of appliances installed under this agreement and agrees that upon replacement, possession of and title to the General Electric Appliances so replaced will revert to the Dealer or Distributor.

If for any reason the Educational Institution should desire to have a larger or more deluxe type of product than they have been using, it is agreed that they will pay the difference between the price of the product installed in the Educational Institution and the special accredited Educational Institution price of the higher-priced product.

If for any reason the Dealer or Distributor is unable to secure replacing appliances through regular channels of distribution and he is prevented from replacing the appliances already installed in the Educational Institution, then no liability will accrue therefor. The Dealer or Distributor agrees, however, to make such installations or replacements in the manner specified as soon thereafter as is practicable excepting that if he is no longer franchised to handle General Electric Appliances the agreement becomes inoperative.

This agreement shall be and remain in force until _____, 19 , and thereafter until terminated by either party at any time upon 30 days' written notice delivered to the other party by personal delivery or registered mail at the address set forth above.

SIGNED:

_____ (Dealer or Distributor)

By _____ (Title)

Date _____

_____ (Educational Institution)

By _____ (Title)

Date _____

MA-273

Go Modern—Stay Modern with this Recommended...

GENERAL ELECTRIC APPLIANCE AGREEMENT PLAN

...new G-E Homemaking Class-...m Plan® makes it possible to equip ...r classrooms with *preferred* appli-...s at *very* special prices . . . ap-...ximately *one half* recommended ...l price. (The price is reduced still ...er when tax refund is applica-... Best of all . . . your homemak-...classroom appliances will be kept ...-to-date *at no cost*, subject to the ...ditions of the special New Model ...agement Plan!

...is plan not applicable in state of ..., where different arrangement exists.

...and in addition ...General Electric Offers

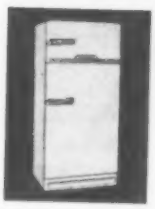
...ENDABILITY—Over the years ...ral Electric has earned and ...tained an enviable reputation ...manufacturing quality products.

...OGNIZED QUALITY—Ac-...ing to a recent survey, most peo-...interviewed said G. E. makes the ...electric appliances for the home.

...TCHED APPLIANCES—Each ..., of G-E Kitchen-Laundry ...pment is designed for individual ...ity, and to blend into a matched ...mble.

...PLETE LINE—General Elec-...provides the most complete line ...kitchen-laundry equipment. You ...only *one* order—deal with only ...organization.

G-E Appliances to Serve You!...



REFRIGERATORS — Models from 7.0 cubic feet to 11 cubic feet. De luxe models feature new revolving shelves.



AUTOMATIC DRYERS — featuring new automatic sprinkler. Can be installed on 115 or 230-volt circuits.



DISHWASHER-SINKS — Models available either as individual units or in combination with sink as shown.



DISPOSAL® — Fits any sink. Sanitary. Sink always stays clean. No messy food waste containers.



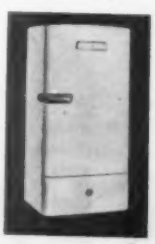
WATER HEATERS — Square counter-top models of 30 and 40 gallon capacity. Round models from 30 to 82 gallon capacity.



AUTOMATIC WASHERS — Activator® washing action, large capacity; selector permits washing small loads also.



RANGES — Sized 24", 36", and 40". Spacemaker 24" model ideal for classrooms where space is at a premium.



FOOD FREEZERS — Chest and upright models with the same dependable sealed-in refrigerating system found in G-E Refrigerators.

Call Your G. E. Distributor *Today* . . .

There's more to modernizing than just buying new equipment! Our planning experts are at your service—ready to help you plan departments that meet your individual requirements and space limitations!

Pick your nearest distributor from this list. Call or write him, today!

CITY AND STATE	DISTRIBUTOR
Albany, N. Y.	A. Wayne Merriam, Inc.
Albuquerque, N. M.	Electric Supply Company
Allentown, Pa.	General Electric Supply Co.
Atlanta, Ga.	W. D. Alexander Co.
Baltimore, Md.	General Electric Supply Co.
Birmingham, Ala.	Matthews Elec. Supply Co., Inc.
Bloomfield, N. J.	General Electric Appliances Co.
Boston, Mass.	General Electric Appliances Co.
Buffalo, N. Y.	General Electric Supply Co.
Charleston, W. Va.	Virginian Electric, Inc.
Chicago, Ill.	R. Cooper, Jr., Inc.
Cincinnati, Ohio	General Electric Appliances Co.
Cleveland, Ohio	General Electric Supply Co.
Columbia, S. C.	Perry-Mann Electric Co., Inc.
Columbus, Ohio	Bard, Inc.
Dallas, Texas	General Electric Supply Co.
Denver, Colo.	B. K. Sweeney Co.
Detroit, Mich.	General Electric Supply Co.
Dubuque, Iowa	Crescent Electric Supply Co.
Fargo, N. D.	Dakota Electric Supply Co.
Fresno, Calif.	Valley Electric Supply Co.
Grand Rapids, Mich.	General Electric Supply Co.
Hartford, Conn.	Orkil, Inc.
Honolulu, T. H.	W. A. Ramsey, Ltd.
Houston, Texas	General Electric Supply Co.
Indianapolis, Ind.	General Electric Appliances Co.
Jacksonville, Fla.	General Electric Appliances Co.
Kansas City, Mo.	General Electric Supply Co.
Lancaster, Pa.	Raub Supply Co.
Los Angeles, Calif.	General Electric Appliances Co.
Louisville, Ky.	General Electric Supply Co.

CITY AND STATE	DISTRIBUTOR
Lubbock, Texas	General Electric Supply Co.
Mankato, Minn.	Southern Minnesota Supply Co.
Memphis, Tenn.	General Electric Supply Co.
Milwaukee, Wis.	Major Appliances Inc.
Nashville, Tenn.	General Electric Supply Co.
New Orleans, La.	General Electric Supply Co.
New York, N. Y.	General Electric Appliances Co.
Oklahoma City, Okla.	General Electric Supply Co.
Omaha, Neb.	General Electric Supply Co.
Philadelphia, Pa.	General Electric Appliances Co.
Phoenix, Ariz.	Arizona Wholesale Supply Co., Inc.
Pittsburgh, Pa.	General Electric Appliances Co.
Portland, Me.	General Electric Supply Co.
Portland, Oregon	General Electric Supply Co.
Poughkeepsie, N. Y.	Electra Supply Co., Inc.
Providence, R. I.	E. Pulver Cook, Inc.
Raleigh, N. C.	Walker Martin, Inc.
Richmond, Va.	R. S. Montgomery, Inc.
Sacramento, Calif.	General Electric Supply Co.
St. Louis, Mo.	General Electric Appliances Co.
St. Paul, Minn.	General Electric Supply Co.
Salt Lake City, Utah	General Electric Supply Co.
San Francisco, Calif.	General Electric Supply Co.
Seattle, Wash.	General Electric Supply Co.
Syracuse, N. Y.	Gould-Farmer Co., Inc.
Toledo, Ohio	Commercial Electric Co.
Utica, N. Y.	Langdon & Hughes Electric Co., Inc.
Washington, D. C.	General Electric Supply Co.
Williamsport, Pa.	Lowry Electric Company, Inc.
Worcester, Mass.	Coghlin Electric Co.

Progress is our most important product

GENERAL ELECTRIC



this time, try MUTSCHLER!

— FOR SCHOOL HOMEMAKING DEPARTMENTS

To save the architect many hours of valuable time, Mutschler Brothers Company makes available a specialty service that includes the design, installation and furnishing of school homemaking departments.

Our sales engineers work directly under your control, just like a part of your staff, to contribute their knowledge and experience in this very specialized field.

When you have a homemaking department job (new or remodeling), call in a Mutschler representative. Let him show you how to incorporate the latest ideas for efficiency and beauty . . . with less expense, less worry for you.

Write for complete specifications and address of nearest Mutschler sales office.

by invitation member

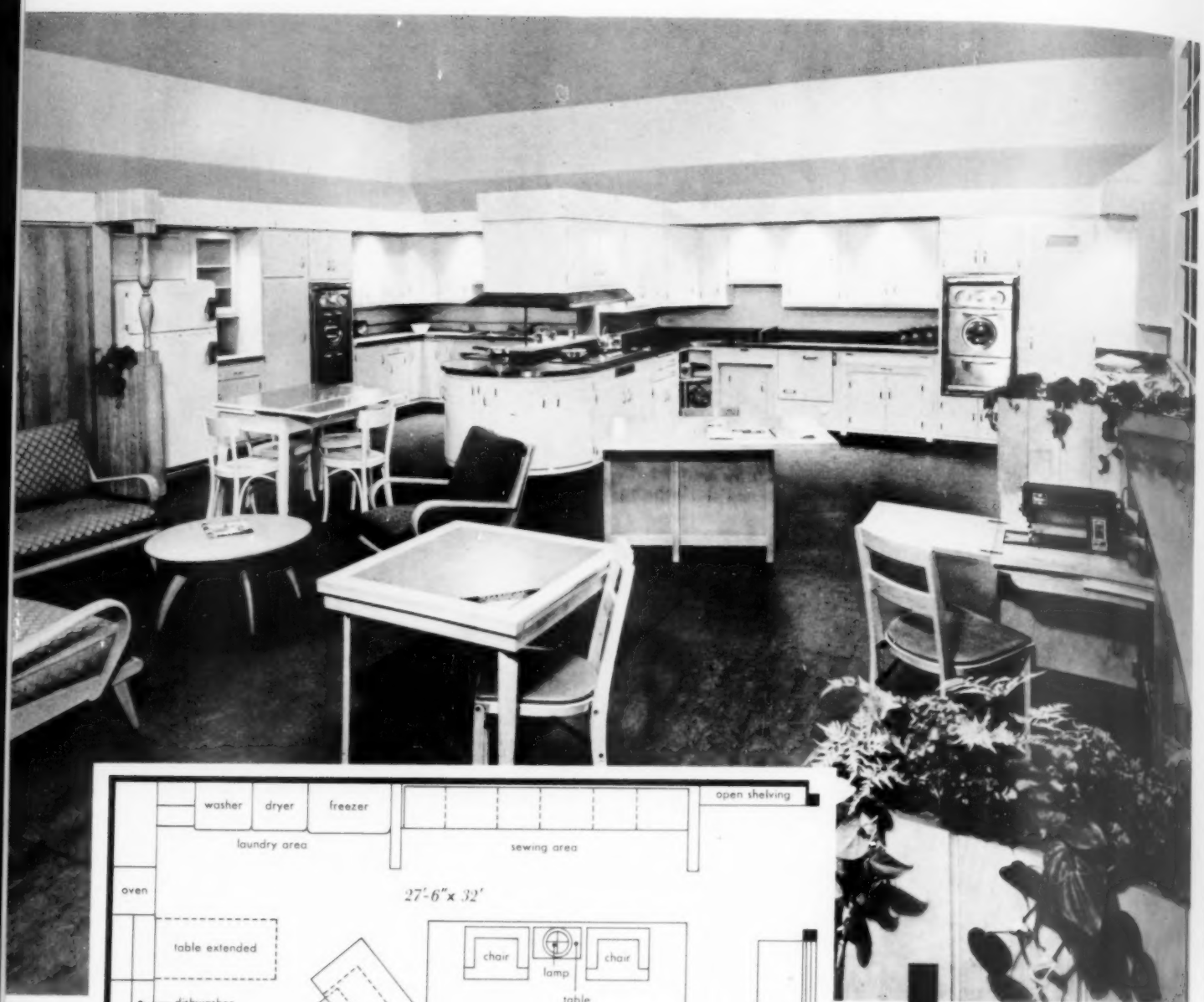
Mutschler
HARDWOOD CABINETRY

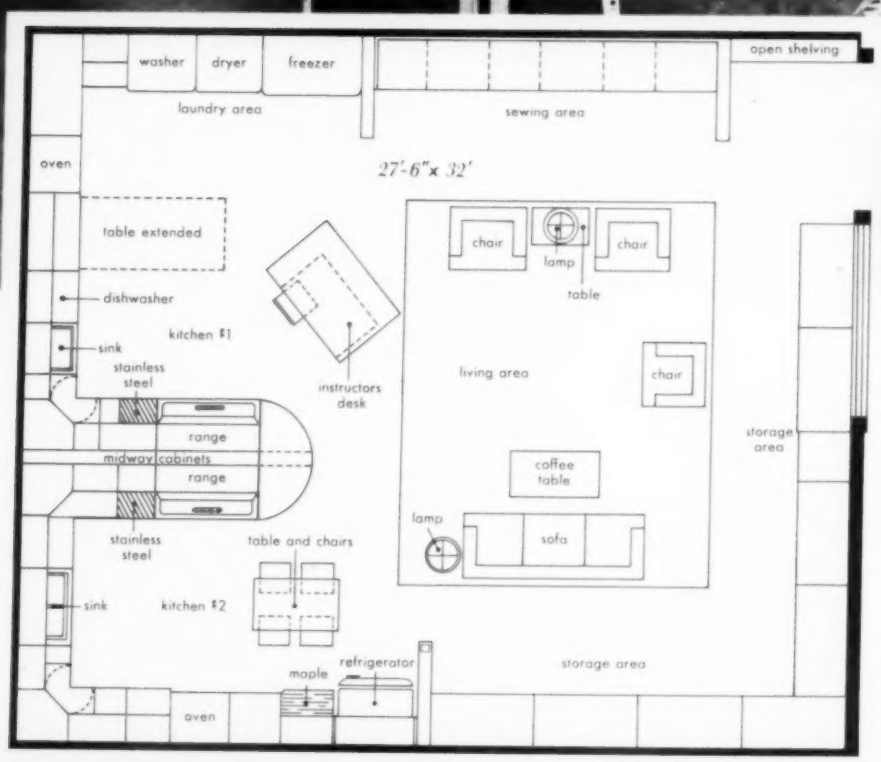
SHOWN ON FOLLOWING PAGES is a typical Mutschler installation of a one-teacher homemaking department, just one of many various plans in schools throughout the country.

MUTSCHLER BROTHERS COMPANY, NAPPANEE, INDIANA

engineering and advisory services through all sales offices

CUSTOM DESIGNED Mutschler HARDWOOD CABINETRY HOMEMAKI





Note from floor plan above how all homemaking facilities are included in this one-teacher homemaking department, yet each different area is segregated to eliminate cross-traffic and interference.

SOURCE LIST OF FURNISHINGS

KitchenAid Dishwasher
Bendix Automatic Gas Dryer
Bendix Automatic Washer
Western-Holly Built-In Ranges & Ovens
Servel Gas Refrigerator
Servel Freezer
Domestic Sewing Machines (Cabinets by Mutschler)
Trade-Wind Ventilating Fan
Shred-away Food Waste Disposal
Stackmore Folding sewing table and chairs
Heywood-Wakefield Furniture
All cabinetry, sink and counter tops by Mutschler

PARTMENT

Close-up of smaller of the two food laboratory sections. Note separate "work zones" for refrigeration, clean-up, cooking and baking, each with adequate storage and work top facilities. Color, leaf green.





Illustration above shows the living area, storage and special-purpose cases. Note the triple-mirror wardrobe, the filing case with roller drawers, magazine case with chart storage below, ironing board and linen case, roll-away bed storage.



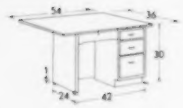
One of the three sewing machines which drop down and slide into case when not in use. Note roller drawer storage.

Cabinetry available in decorator colors or natural maple.



Close-up of larger food laboratory section, also equipped with complete, spacious "work zones". Note pull-out table and adjacent laundry area. Color, sun yellow.

TYPICAL HOMEMAKING DEPARTMENT UNITS



MODEL 5436-ID
Instructor's Desk



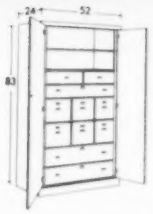
MODEL 6663-PS
Portable Screen



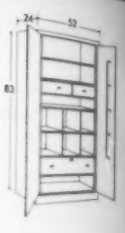
MODEL 8348-S
Equipment Storage Case



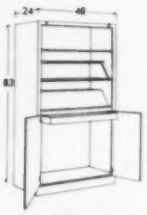
MODEL 8352-OC
Open Compartment Storage Case



MODEL 8352-F
Filing Case



MODEL 8352-CC
Child Care Case



MODEL 8348-CM
Chart and Magazine Storage Case



MODEL 8348-IM
Illustrative Materials Case



MODEL 8348-ES
Equipment Storage Case



MODEL 8348-RB
Roll-Away Bed Storage Case



MODEL 5230-FT
Folding Table



MODEL 22-C
General Purpose Chair



MODEL 21-FC
Folding Chair



MODEL 8348-TP
Tool and Paint Storage



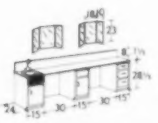
MODEL 4036-OS
Open Shelving

MODEL 2836-OS
Open Shelving





MODEL 8348-IB5S
Ironing Board Case



MODEL B15C-LS
Grooming Storage Base

MODEL B15-LSB
Grooming Bowl Base

MODEL 15-GM
Grooming Mirror



MODEL 8348-WM
Wardrobe Mirror Case



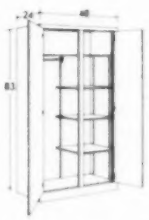
MODEL 8348-LM
Wardrobe Case



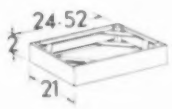
MODEL 8324-W
Wardrobe Case



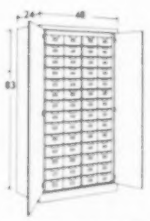
MODEL 8348-WB
Corner Wardrobe Case



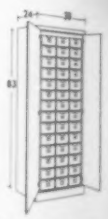
MODEL 8348-W
Wardrobe Case



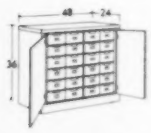
Sub-Base Assembly



MODEL 8348-TD
Tote Drawer Case



MODEL 8338-TD
Tote Drawer Case



MODEL 3648-TD
Tote Drawer Case



MODEL 4830-ST
Sewing Table



MODEL 8324-IB
Ironing Board Case



MODEL 8316-IB
Ironing Board Case



MODEL 7265-SM
Portable Sewing Mirror



MODEL 8436-CT
Cutting Table

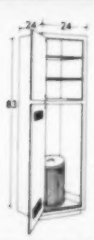


MODEL 1818-FS
Fitting Stand

TYPICAL FOODS LABORATORY AND LAUNDRY UNITS



MODEL 8324-A
Apron Storage



MODEL 8324-RS
Refuse Storage Case



MODEL 8348-CU
Cleaning Utensil Case



MODEL 2540-RT
Refectory Table



MODEL 4224-SC
Serving Cart



MODEL B21-TRS
Refuse Storage Base



MODEL 8348-FS
Foods Storage Case

MUTSCHLER BROTHERS COMPANY, NAPPANEE, INDIANA

engineering and advisory services through all sales offices

E c/3





homemaking room equipment

WOOD-METAL®

WOOD-METAL INDUSTRIES, INC.

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WM. S. COVERT ELEM. SCHOOL
Rockville Centre, N. Y.
Architect: Walter D. Spelman

HOLMES SCHOOL
Philadelphia, Pennsylvania
Architect: Philadelphia Board of Education

GRANTWOOD SCHOOL
Cedar Rapids, Iowa
Architect: Childs & Smith

OHIO STATE UNIVERSITY
Columbus, Ohio
Architect: Howard Dwight Smith

ST. CHARLES HIGH SCHOOL
St. Charles, Ill.
Architect: Perkins & Will

UPPER DARBY HIGH SCHOOL
Upper Darby, Pa.
Architect: Bender, Young & Schaffer

ST. CATHERINE'S ACADEMY
New York, N. Y.
Architect: Eggers & Higgins

MOULTRIE HIGH SCHOOL
Moultrie, Georgia
Architect: Assoc. School Architects

CARMEL ELEMENTARY SCHOOL
Carmel, New York
Architect: E. G. Atkinson

SOUTHERN HIGH SCHOOL
Okolona, Kentucky
Architect: Fred J. Hartstern

SOUTH HIGH SCHOOL
Akron, Ohio
Architect: Akron Board of Education

WIDENER SCHOOL
Philadelphia, Pa.
Architect: Pepper Associates

BUCK'S HILL SCHOOL
Waterbury, Conn.
Architect: Francis L. S. Mayers

PINE BUSH CENTRAL SCHOOL
Pine Bush, N. Y.
Architect: Henry Halverson

B. F. STANTON SCHOOL
Canton, Ohio
Architect: Firestone & Hotter

NORWELL HIGH SCHOOL
Norwell, Mass.
Architect: J. Williams Beal, Sons

FLOYD B. WATSON ELEM. SCHOOL
Rockville Centre, N. Y.
Architect: Walter D. Spelman

OLD GREENWICH SCHOOL
Old Greenwich, Conn.
Architect: Coffin & Coffin

DREW SCHOOL
Philadelphia, Pa.
Architect: Phila. Board of Education

SKENEATELES CENTRAL SCHOOL
Round Lake, N. Y.
Architects: Perkins & Will

RIVERSIDE SCHOOL
Riverside, Conn.
Architect: William B. Tabler

HYNDMAN LONDONDERRY SCHOOL
Hyndman, Pa.
Architect: Hunter, Caldwell & Campbell

GAITHERSBURG HIGH SCHOOL
Gaithersburg, Md.
Architect: A. R. Cloe

WINFIELD TOWNSHIP SCHOOL
Winfield Township, N. J.
Architect: Pahlman & Henry

JUNIATA HIGH SCHOOL
Mifflintown, Pennsylvania
Architect: George Edmund Reed

EAST MOUNTAIN ELEMENTARY SCHOOL
Waterbury, Conn.
Architect: Francis L. S. Mayers

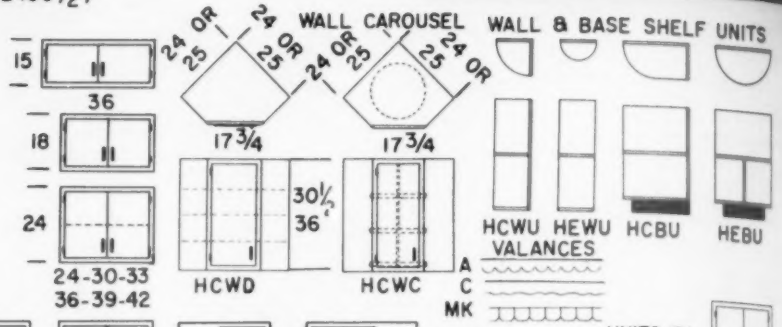
BLADENSBURG HIGH SCHOOL
Bladensburg, Md.
Architect: Ross and Walton

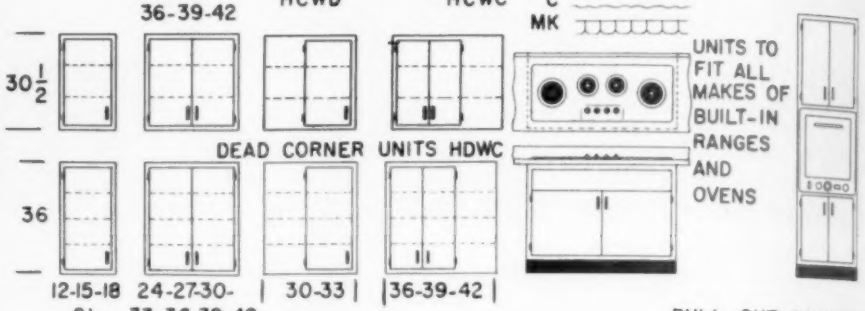
JENNERS BOSWELL SCHOOL
Boswell, Pa.
Architect: Hunter, Caldwell & Campbell

MIFFLINBURG HIGH SCHOOL
Mifflinburg, Pa.
Architect: George Edmund Reed

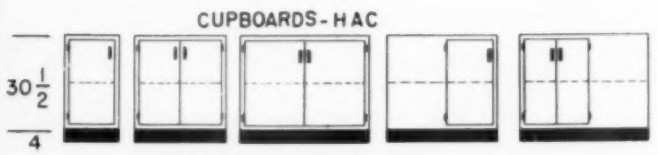
CABINETS

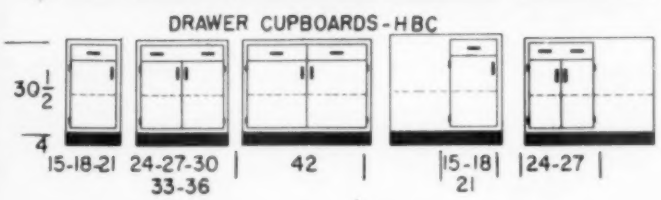
WALL UNITS - HW-12½" DEEP. TO SPECIFY USE IDENTIFYING LETTERS FOLLOWED BY WIDTH AND HEIGHT (FOR EXAMPLE- HW-2430½)

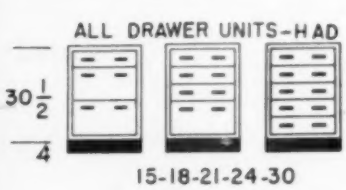




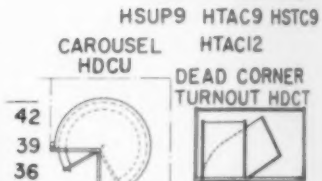
BASE UNITS 24" DEEP. TO SPECIFY USE IDENTIFYING LETTERS FOLLOWED BY WIDTH





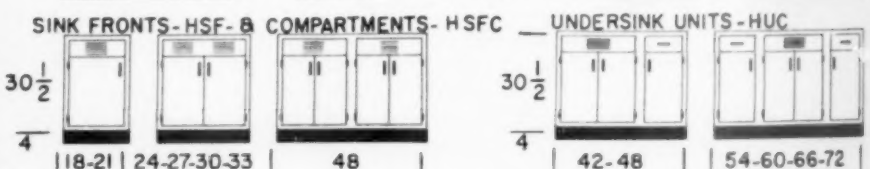


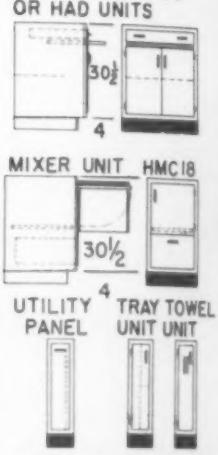




TOPS OF LINOLEUM, PLASTIC, STAINLESS STEEL, HARDWOOD & VINYL TO FIT ALL REQUIREMENTS







ON SINGLE DOOR UNITS, SPECIFY LEFT OR RIGHT HINGE


BREAD BOX


CUTLERY TRAY


SLICING BOARD


SOAP RACK

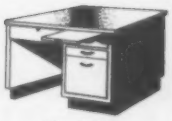

TRAY RACK


SLIDING DOORS

CASEWORK & FURNITURE

WOOD-METAL Industries, Inc.

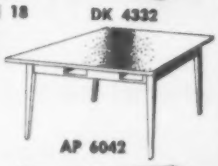

CH 18

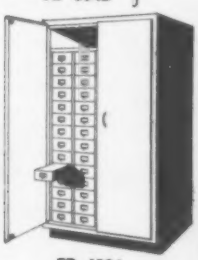

DK 4332


SC 4325


RT 4123


ST 4830


AP 6042

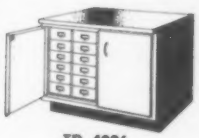

TD 4884


MR 3618

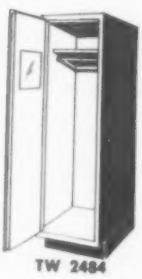

FP 1818

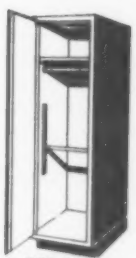

OS 2428
OS 3628

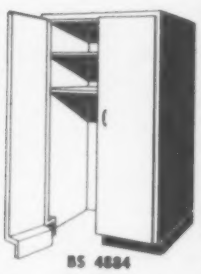

FC 3647


TD 4836

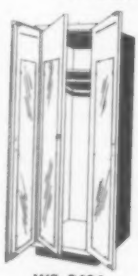

IB 4884

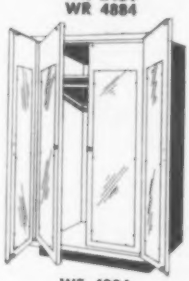

TW 2484

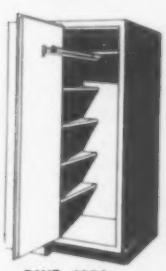

WR 2484
WR 4884

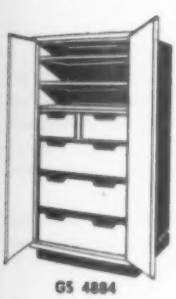

BS 4884

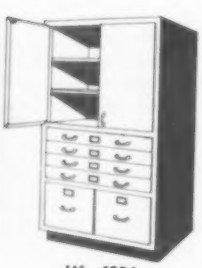

FM 72

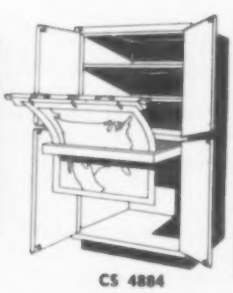

WF 2484

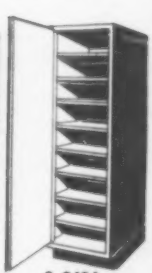

WF 4884


DWR 4884

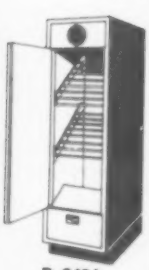

GS 4884

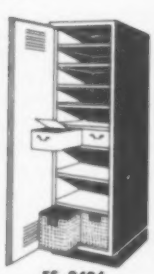

IM 4884

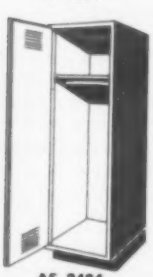

CS 4884


S 2484
S 4884


C 2484


D 2484
D 4884


FS 2484
FS 4884

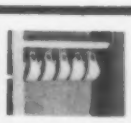

AS 2484
AS 4884


RC 2484


SLIDING TOWEL ROD


SLIDING FLUTED GLASS DOORS


STEP SHELF


CUPHOOK RACK


GLAZED DOORS

CH 18 CHAIR, blonde beatwood legs and back supports, seat and back of birch, maple, or walnut.

DK 4332 DESK 42" W x 32" D x 30½" H, has linoleum top, file drawer, 3 shallow drawers, and pull-out shelf. Knee space drawer has lock.

SC 4325 SERVING CART 43" L x 25" W x 36" H, with pull-out shelf. Top material as specified, with hardwood edging. Hard rubber ball-bearing casters.

RT 4123 REFECTORY TABLE 41" x 41" open, 41" x 23" closed, 30½" high; two 9" leaves slide under top. Top material as specified.

ST 4830 CUTTING TABLE 78" x 30" open, 48" x 30" closed, 36" high, with two 15" drop leaves and hardwood top.

AP 6042 ALL-PURPOSE TABLE 60" L x 42" W x 30½" H, accommodates 4 tote drawers, top of black tempered Presdwood with hardwood edging.

FP 1818 FITTING PEDESTAL 18" L x 18" W x 12" H, has black Presdwood top with hardwood edging, and rubber shoes.

OS 2428 OPEN SHELF UNIT 24" W x 28" H x 12½" D, has fixed shelves.
OS 3628 OPEN SHELF UNIT same as above except 36" wide.

MR 3618 MAGAZINE RACK 36" W x 18" H x 12" D.

FC 3647 FILE CASE 47" H x 36" W x 24" D, has 3 letter size and 3 legal size drawers. Top material as specified.
FC 3647A FILE CASE, same as above except with six letter size drawers.

TD 4836 LO-BOY TOTE DRAWER CABINET 48" W x 36" H x 24" D, has 24 tote drawers. Top material as specified.

TD 4884 TOTE DRAWER CASE 48" W x 84" H x 24" D with 86 heavy gauge furniture steel tote drawers with baked on hammer-laid finish.

IB 4884 IRONING BOARD STORAGE 48" W x 84" H x 24" D, with two compartments for ironing boards and 4 asbestos covered shelves for irons.

TW 2484 TEACHER'S WARDROBE 24" W x 84" H x 24" D, has fixed shelf, clothes bar, mirror, and lock.

WR 2484 WARDROBE 24" W x 84" H x 24" D, has fixed shelf, one fixed rod, and one adjustable rod.
WR 4884 WARDROBE, same as above, except 48" wide and with 2 doors.

BS 4884 FOLDING BED STORAGE 48" W x 84" H x 24" D, with 1 fixed and 1 adjustable shelf.

FM 72 PORTABLE FITTING MIRROR 72" H, center panel 27½" W, side panels 19½" W, triplicate mirror mounted on hard rubber casters.

WF 2484 WARDROBE FITTING CASE 24" W x 84" H x 24" D, with 3 doors equipped with full length mirrors, fixed shelf, and clothes rod.

WF 4884 WARDROBE FITTING CASE 48" W x 84" H 24" D, four doors equipped with full length mirrors, fixed shelf, and clothes rod.

DWR 4884 DEAD CORNER WARDROBE 48" W x 84" H x 24" D, has 4 adjustable shelves, 1 fixed shelf, and pull-out clothes hanger. Indicate dead corner to left (L) or right (R), L illustrated.

GS 4884 GENERAL STORAGE CASE 48" W x 84" H x 24" D, with 2 drawers, 3 large trays on progressive ball-bearing slides, and 2 adjustable shelves.

IM 4884 ILLUSTRATIVE MATERIAL CASE 48" W x 84" H x 24" D, has 2 file drawers, 4 shallow drawers, and 2 adjustable shelves.

CS 4884 CHART STORAGE CASE 48" W x 84" H x 24" D, has rods for 12 charts, which may be suspended from hooks in top strip, upper section has 2 adjustable shelves.

S 2484 STORAGE CASE 24" W x 84" H x 24"D with eight adjustable shelves.
S 4884 STORAGE CASE same as above except 48" W and with 2 doors.

C 2484 CLEANING UTENSIL STORAGE 24" W x 84" H x 24" D with 2 fixed shelves, six hooks, and two soap and powder racks. Bottom and 8" of sides and back have black Presdwood lining.

D 2484 TOWEL DRYER 24" W x 84" H x 24" D with fourteen removable towel rods, electric hot air blower, stainless steel baffles, and bulls-eye switch.
D 4884 TOWEL DRYER, same as above but 48" wide and with 2 doors.

FS 2484 FOOD STORAGE CASE 24" W x 84" H x 24" D, with 2 metal vegetable bins, 2 tinned canisters and 8 adjustable shelves.
FS 4884 FOOD STORAGE CASE, same as above except 48" wide and with 2 doors, 4 metal vegetable bins, and 4 tinned canisters.

AS 2484 APRON STORAGE CASE 24" W x 84" H x 24" D, has revolving rack with hooks for 48 aprons, and fixed shelf.
AS 4884 APRON STORAGE CASE, same as above except 48" wide and with 2 doors and 2 racks, capacity of 96 aprons.

RC 2484 REFUSE CONTAINER CASE 24" W x 84" H x 24" D, 8" high black Presdwood protective lining, upper section has three fixed shelves.

On single door units, specify left or right hinge.

Wood-Metal Institutional Cabinets

specifications, natural and enameled finish

a. materials

Lumber: All exposed wood parts shall be of the finest select northern grown hardwoods for natural finished cabinets and cases and of the finest select hardwoods for enameled cabinets and cases. Hardwood for interiors shall be unselected but sound. All lumber shall be properly seasoned and scientifically kiln dried to 6% or less moisture content and then tempered before fabrication.

Plywoods: All plywoods for exposed surfaces of natural finished cabinets shall be of select Birch or Maple.

b. parts

Doors: Shall be of flush construction of select hardwood plywood for natural finished units and of grainless tempered Presdwood for enameled units, laminated to both sides of kiln dried edge grain frame, with grilled interior giving maximum warp resistance.

Drawers: Heads shall be of same materials and construction as doors except of solid lumber core or of select hardwood. Sides shall be ½" thick, tongued, grooved and glued into heads, with ½" thick backs tongued, grooved, and glued into sides. Bottoms shall be plywood for natural finished cabinets and grainless tempered Presdwood for enameled units, grooved into front, back and sides.

Drawer Slides: Shall be heavy 16 gauge steel channels for case members with sliding plastic drawer member; or, at small additional cost, of heavy 16-gauge cadmium plated cold rolled steel with double ball-bearing rollers on each side, four ball-bearing rollers to each drawer, with automatic stops.

Cabinet Sides: Exposed sides shall be flush of same material and essentially same construction as doors. Concealed sides shall be of plywood or of panel construction. Sides shall be tongued, grooved, and glued into front frames, with glue blocks or angle irons for additional re-enforcement, eliminating the use of nails through front frames. The use of nails through the front frames will not be acceptable.

Tops and Bottoms: Shall be of same material and essentially same construction for wall cabinets, as doors, or of plywood or solid lumber as required. They shall be tongued, grooved and glued into sides and overlap top wall hanging strip which fits in the recessed back insuring maximum hanging strength. Tops which are not tongued and grooved, and glued into sides and which do not overlap hanging strip, are not acceptable.
Bottoms of base cabinets shall be of plywood or grainless tempered Presdwood, grooved into sides resulting in tight sanitary corners.

Front Frames: Shall be 1¾" wide of select hardwood as outlined under lumber, with concealed mortised and tenon joints, glued and metal doweled. Open and unsanitary mortise and tenon joints in front frames shall not be acceptable. Front frames shall be grooved to receive tongue of sides which when glued to sides eliminates nails through front frames.

Shelves: Shall be adjustable in all wall cabinets and storage cases and fixed ¾ depth in base cabinets.

Backs: Shall be of plywood for natural finished and of grainless tempered Presdwood for enamel finished wall cabinets and cases. Backs shall be of grainless tempered Presdwood for base cabinets. Backs shall be grooved into sides of wall and base cabinets. Wall cabinet backs shall be fitted with top and bottom strips fitted inside recessed back for anchoring cabinet rigidly to wall.

Subbases: All subbases to be covered with coved rubber base molding.

Tall Cases: Front frame to be of select hardwood as outlined under lumber, 1⅛" thick by 1¾" wide with concealed mortise and tenon joints, glued and metal doweled. Doors, and sides to be flush and of same material and construction as for wall and base cabinets. Backs to be of plywood for natural finished units and of grainless tempered Presdwood for enameled units, dadoed into sides, securely fastened to top and bottom frames, and further reinforced with glue blocks. Backs to be recessed. Tops and bottoms to be of plywood for natural finish and grainless tempered Presdwood for enameled units, on top and bottom frames which are securely glued and screwed into sides and front frame. Shelves shall be adjustable.

c. hardware

Hinged doors for all wall and base cabinets and cases shall have 2½" high by .072" thick heavy duty, bronze or chrome institutional type five-knuckle pin hinges designed so that it is not necessary to cut through door lip to hang to frame. Offset kitchen cabinet type hinges will not be acceptable. Hinge screws shall be concealed when door is closed. Doors under 44" high shall have one pair of hinges and those over 44" high shall have 1½ pairs of hinges. Pulls to be streamlined solid chrome plated or bronze institutional type.

Drawers under 27" wide to have one drawer pull and those 27" wide and over to have two pulls.

Sliding wall and base cabinet doors to have fiber sheaves and track. Sliding case doors to have Grant Pulley #2010 metal track and #2020 sheave. Catches to be of heavy, positive, silent, rubber roller type.

d. finish

Natural Finish: To be a Blonde, Honeyed, Autumn or Lime Gray as selected. To be obtained by a thorough sanding followed by Stain or Lime Gray filler coat. Surface to be then sanded and to receive a thorough coat of penetrating sealer. When thoroughly dry, surface to be then finished with highest grade of semi-gloss clear acid and alkali resistant varnish.

Enamelled Finish: To be obtained by thorough sanding of cabinets and cases, followed by application of highest grade primer coat. When thoroughly dry, the prime coat shall be carefully sanded, and then receive highest grade enamel finish, in WOOD-METAL'S standard white or in any of WOOD-METAL'S twelve standard colors. The interior surfaces of the cabinet and bottom of wall cabinets shall be given the same careful finishing process as the exterior of the cabinet. The underside of base cabinets and cases and outside backs of all cabinets shall be given a heavy sealer coat.

sink and counter tops

Sink and counter tops shall be constructed of ¾" thick exterior grade plywood. Surface material of linoleum, plastic or 20 USS gauge stainless steel shall be glued with water-proof glue and heavily pressed by special presses to plywood, insuring a thorough bond.

Front and side edges shall be trimmed with 1½" non-drip stainless steel edging and all corners shall be neatly mitred and soldered.

Back splashers of heights as specified shall be properly screwed to deck and joint sealed with stainless steel cove moulding to insure against water leakage. Top and sides of back splashers shall be trimmed with 1" stainless steel edging.

Sink Bowls: Shall be of stainless steel, porcelain on steel or enameled cast iron, single bowl or double bowl as specified. They shall be securely fastened from the underside of sink top with clamps secured by special expansion bolts into the bottom of the top, thereby insuring smooth surfaces free from any surface marring. Bowls shall be sealed to 1" stainless steel channel with water-proof mastic.

Faucets and Strainers: Faucets shall be of the deck type, chromium plated and with or without hose spray or aerators, as specified. Streiners shall be chromium plated crumb cup type.

(Specifications subject to change due to government regulation, defense supply conditions or other emergencies beyond our control.)

WOOD-METAL INDUSTRIES, INC.®
Kreamer, Snyder County, Pennsylvania
Selinsgrove 2711

W4-454

SINGER SEWING MACHINE CO.

149 Broadway, New York 6, N. Y.

Now you see the machines!

Now you don't!





New double-purpose table solves space problems...makes teaching easier

Many sewing classrooms . . . like the one you see here at the Abbett School in Fort Wayne, Indiana...are installing the new SINGER* Combination Sewing and Cutting Table.

Teachers call it "the most practical piece of sewing-class equipment ever designed." See how it can save time and work for you—make your classroom more pleasant, more efficient.

The new SINGER Combination Sewing and Cutting Table

Provides machines for two students, work space for two more!

Now—even if classroom space is limited, you can have *two* machines for every four students!

No need for a separate row of space-consuming cabinets. No need for the class to be constantly shifting and shuffling around. The new SINGER Table holds two full-sized SINGER Machines—and at the same time provides work space for two other students.

Converts to a smooth-surface cutting table in a jiffy!

You don't have to use up space with separate cutting tables, either!

Simply lower machines into SINGER Table—slip removable panels back into place—you have a smooth, continuous surface. (An extra blessing if room is used for other classes or study hall.)

Developed with the cooperation of leading educators—the table meets *every* sewing room need.

Gives you all these de luxe features:

- 5-ply construction. Durable Formica top. Birch, blond, or *choice* of colors.
- 4 handy drawers.
- Built-in knee levers.
- Dustproof shields which completely enclose machines when they are lowered into table.
- Tamper-proof locks on panels.
- Provision for adding automatic switch to cut off power when machines are lowered.
- Size 60″x 42″x 30″.

Available with any of the regular SINGER* Sewing Machine classroom heads—*at a special school discount.*

For tops in TV drama, tune in "SINGER FOUR STAR PLAYHOUSE." See local newspaper for time and station.

*** DON'T BE MISLED.** SINGER sells and services its products only through SINGER SEWING CENTERS, identified by the Red "S" Trade-Mark on the window and listed in your phone directory only under SINGER SEWING MACHINE CO.

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SIMMONS COMPANY

Chicago 54, Merchandise Mart
San Francisco 11, 295 Bay Street
New York 16, One Park Avenue
Atlanta 1, 353 Jones Avenue, N.W.
Dallas 9, 8600 Harry Hines Boulevard



This room features Simmons new Beautyrest Sleep-Lounge — a sofa by day and a bed by night, and new F-330 Desk. Chairs are F-711 and new "Recov" F-770 with removable cover. Chest is the compact F-152-24 designed especially for double rooms.

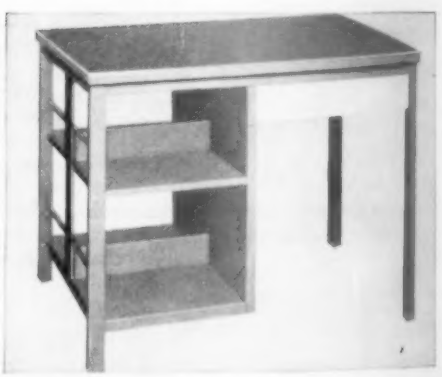
furnished by SIMMONS

. . . FOR COMFORT, EASY MAINTENANCE . . . AND DURABILITY!

Here's practical dormitory furniture that looks good, wears well, and fits the student's needs perfectly. The construction: durable fireproof steel, electrically welded throughout . . . joints can't come apart, will not warp, swell or split. The finish: long-wearing Simfast that won't peel or chip, resists all manner of wear and tear. The design: student tested and approved, for maximum comfort and style with a minimum of maintenance.

Ask your supplier to show you the features that make Simmons steel furniture operate so smoothly and noiselessly. Have him show you the wide variety of decorator approved pastel colors and wood-grain finishes that will please the most color-conscious student. He'll be able to give you information on the full line of Simmons dormitory furniture, so that you can furnish rooms of any size or shape in durable Simmons steel.

Shown here are but a few of the wide variety of pieces available. Send for Simmons' new catalog. Write to any of the Simmons display rooms listed.



Simmons New Student Desk F-330—The most practical student desk ever built. Extra-large top—full 30 x 42 inches. Gives plenty of work space, even for engineering and architecture students. Has double the book space of most desks. Available either in right-hand or left-hand models.

SIMMONS COMPANY

STURDY STEEL FURNITURE ... FROM SIMMONS COMPLETE LINE



Duet Desk F-152-21—Has knee space on both sides. Compactly designed, yet ample for two. Each student has own drawer and book space. Saves cost of second desk. Top surface, 47½ x 32 inches.



"Recov" Chair F-765—A comfortable, modern easy chair with foam rubber seat and back wood arms. Cover can be removed for cleaning or recovering. F-770 "Recov" with metal arms.



Dresser F-152-2—Medium sized dresser. Three drawers. Top drawer has center partition. Top area, 38½ x 19 inches. Available in two other sizes, 30½ x 19 inches and 44 x 19 inches. Mirror extra.



Chair F-732—Quality steel construction combined with low cost. Rear legs extend beyond backrest to prevent marring wall.



Bed H-348, with Coil Support L-1601—Sturdy all-steel construction, ribbon fabric SKC spring. Coil support L-1601 gives firmness to spring, provides extra support to mattress.



Bed DB-930 with Underbed Drawers F-90—Demountable Double Deck Bunk serves either as bunk or as twin beds. Underbed drawers provide extra storage space for small rooms.



Chest F-152-5—Five drawers with center partitioned top drawer. 52 inches high, with top area 30½ x 19 inches. Provides ample drawer space while using a minimum of floor space.

Dorm-Bilt Mattress
Here's a mattress designed especially for dormitories. 216 Coil Springs covered with durable insulator and deep felt upholstering. ★★★Three-Star Crushproof Border gives mid-mattress support right up to the edge. It's the heavy-duty mattress —your best buy for all flat or coil spring beds—built by Simmons, makers of Beautyrest*, the world's most comfortable mattress.

*Trade-mark Reg. U.S. Pat. Off.



CONTRACT DIVISION

SIMMONS COMPANY

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295 Bay Street, San Francisco 11
353 Jones Avenue, N.W., Atlanta 1
8600 Harry Hines Boulevard, Dallas 9

SUPERIOR SLEEPRITE CORP.

CONTRACT DIVISION

759 S. Washtenaw Ave., Chicago 12, Illinois



Combines All Most Desirable Construction Quality Features With Greatest Long Term Economy



CT 650-57
CHEST-O-BED*

If limited space presents a problem, use Chest-O-Bed. Fully enclosed chest supplies drawer space equal to or greater than many three-drawer chests . . . and no extra floor space required! Complete with special, double deck coil spring.

* T. M. Reg. U. S. Pat. Off.

- **VITARITE* SYNTHETIC, BAKED-ON ENAMEL FINISHES . . . easy to maintain. Permanently resistant to stains, burns, alcohol, and other dormitory use hazards.**
- **NON-WARPING, ALL METAL CASE CONSTRUCTION . . . assures life-long service with minimum maintenance troubles.**
- **ALL DRAWERS HAVE CENTER GUIDES and WOOD CENTER AND SIDE DRAWER RUNNERS . . . as well as rubber stops, giving smoothest, quiet drawer operation.**
- **SYNTHETIC RUBBER UNDERCOATING IN ALL CASE INTERIORS . . . efficiently minimizes sound noises to negligible level.**

Manufactured by skilled craftsmen, Superior Sleeprite's CT 650 suite embodies beauty of design, excellence of construction, and rugged durability unsurpassed. Beautiful Vitarite finishes in solid or two-tone colors, and grain finishes are available for any decorating scheme. Illustrated are: CT 4309 side chairs; CT 650-22LN double study desk; CT 650-4 chests; CT 650-10 beds; CT 650-6 nite table; and CT 4320 lounge chair.

* T. M. Reg. U. S. Pat. Off.

ADDRESS INQUIRIES TO: CONTRACT DIVISION
SUPERIOR SLEEPRITE CORP., 759 S. WASHTENAW AVE., CHICAGO 12, ILL.

THE SUPERIOR SLEEPRITE CORPORATION



CT 2650 CONVERTIBLE DOUBLE BUNK BED—Ruggedly constructed with 1½" square tubing and open panel ends. Easily converted for twin use. Over-all height, 62"; bottom spring height, 16"; top spring height, 53"; inside length, 76½"; width, 3/0.

Illustration shows choice of two spring applications. Top spring, as CT 2650/1, is 3-pc., 6" riser link fabric type with double hook corner locks. #7 Posture Coil Unit shown is detachable and available at extra cost. Bottom spring, as CT 2650/6, is 3-pc., 6" riser slat band type. CT 180 Chest-O-Bed Sections shown are detachable and available at extra cost.

All Metal Products Available in Finishes to Match Sleeprite Case Pieces



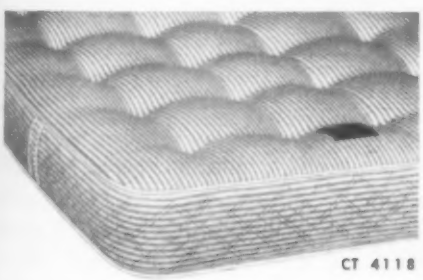


CT 650-7 DESK—Legs fabricated of 1½" square tubing for rigid durability. Drawer is equipped with center guide, wood drawer runners, and rubber cushioned drawer stop. Height, 30½"; width, 34½"; depth, 19".

CT 4650/6A DORMITORY BED—Open panel ends with 1½" square tubing. 3-pc., 6" riser slat band spring with heavy side rails of cambered oval tubing giving extra rigidity. Over-all height, 21½"; spring height, including rubber cushioned glides, 16"; width, 3/0.



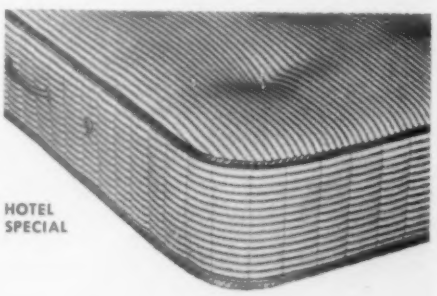
CT 4326 ARM CHAIR—Strong, 1-3/16" tubing. Seat and back upholstered with long wearing Duran or Naugahyde. 34½-in. high; seat, 18½-in. wide, 17½-in. deep.



CT 4118

CT 4118 INNERSPRING MATTRESS—209-coil, French inneroll construction (4/6). Sisal pad insulation, layer-cotton-felt upholstery. 6 1/5-oz. A.C.A. cover with droll stitched self border. Gray taped seams; taped strap handles; 8 vents. 3/3 or 4/6.

HOTEL SPECIAL INNERSPRING MATTRESS—Deluxe 312-coil unit. Sisal pad insulation; layer-cotton-felt upholstery. 1600-grade, 8-oz. A.C.A. ticking. Fancy taped seams; channel stitched border; genuine inneroll construction. 3/3 or 4/6.



HOTEL SPECIAL

TO LIVE RIGHT... Sleeprite®

JAMESTOWN-STERLING CORPORATION

Jamestown, New York



DORMITORY FURNITURE

in solid oak

solid maple

solid birch



Nicely designed bedroom furniture with solid construction to take abuse and still look good.

29 years experience making or manufacturing bedroom furniture, qualifies us to correctly interpret your requirements. Requests for quotations will receive prompt attention from Jamestown-Sterling Corporation, Jamestown, N. Y.

CARROM INDUSTRIES, INC.

Ageless Wood Furniture for Dormitories

Ludington, Michigan



Built for longer life! The room scene shown above (No. 5036) is one of Carrom's five beautifully designed dormitory furniture groupings. Bed, No. 5036; Chest, No. 5432½; hanging mirror, No. 2828; desk, No. 5313; side chair with wood seat, No. 5007W; easy chair with slip cover, No. 5173; bedside table, No. 5005. Top of chest, desk and bedside table and arms of easy chair can be obtained with burn-proof Formica.

YOUR CHOICE OF 5 CARROM GROUP DESIGNS

Beautifully designed Carrom Dormitory Wood Furniture provides a *warmth* that is so ideal for study and relaxation. Constructed exclusively for institutional use and guaranteed to withstand the hardest usage, it assures outstanding durability. You have a choice of five differently designed groupings and of seven distinctive finishes.

Carrom Wood Furniture is priced with a view to institutional budget requirements. Carrom upholstery, springs and mattresses provide the utmost in comfort and years of trouble-free service.

If you are planning to buy a single piece, or furniture for an entire building, write for Carrom literature now.

CARROM INDUSTRIES, INC.

LUDINGTON, MICHIGAN

1954 . . . Our 65th Year



CARROM OFFERS YOU A MONEY-SAVING SERVICE!

If you want an intelligent analysis of wood furniture versus metal . . . or facts on durability, design, finish, construction and upholstery . . . or help in selecting specific types of beds, chairs, dressers and other pieces . . . or someone who can work with your interior decorator or architect to assure you a *real buy* in furniture . . .

WRITE FOR A CARROM MAN TODAY!

THE SCHOOL EXECUTIVE
470 Fourth Avenue, New York 16, N. Y.

The School Lunch

—a Monthly Editorial Feature

Among the most rapidly growing services in schools is the school lunch. Today 10 million children—approximately one third of the total enrollment—are served lunches in the 57,000 schools that participate in the Federal school lunch program.

The planning of food service facilities, recruitment and training of personnel, problems of operation and maintenance and how to make the school lunch contribute to the health and educational growth of children are all matters of continuing concern to school administrators.

To help school administrators keep informed in this area, School Executive devotes an editorial section each month to "The School Lunch." Here are some articles scheduled for School Lunch Section:

Subscription Rates:
1 year $4.00
2 years $6.00

January — **School Lunch Program in 1953**—*Orpha Mae Thomas*
Highlighting the year's growth in school food service developments in integrating lunch with the school curriculum.

February — **Maury Combines Learning with Gracious Living**—*Margaret Schachte*
Student participation in the lunch program makes the Maury Cafeteria the school social center.

March — **Cooperative Administration—Key to Cedar Rapids Lunch Program**—*Ruie B. Doolin*
The roles of the division director, Cafeteria Directors, Building Engineers, Principals and Cooks in lunchroom planning, equipping and operation in Cedar Rapids schools.

April — **Lunch is a Lab Period**—*Charles Bradley*
How an elementary school lunch program provides both for physical needs and educational growth.

May — **Federal Administrative Policies on the National School Lunch Program**—*C. Roy Murphy*
Congress and the states working together to safeguard the health and well-being of the nation's children.

June — **Make the Outdoors a Lunchroom**—*Arthur G. Hoff*
Description of equipment and facilities for outdoor dining in California schools served by a central kitchen.

July — **Arlington's Goal: Efficient, Maximum Service**—*Mary Handlin*
A cafeteria planned to serve 500 complete meals and 1400 a la carte servings in two 35-minute periods.

August — **The American School Food Service Association**—*Margaret E. Prentice*
A story about national professional association of educators, laymen and school lunch personnel.

September — **The School Cafeteria**—*Kathrine Baker*
Why provisions should be made to make the school lunchroom activities a definite part of the school program.

October — **To Eat or Not To Eat**—*Robert Nareau*
Developing good eating habits, overcoming food prejudices, and introducing children to a variety of new foods hitherto strangers to their daily diet is the goal set forth by the Del Paso Heights Elementary School District.

November — **The Student Council and The School Cafeteria**—*Millicent Thompson*
The part a Student Council can play in helping its Cafeteria Director.

F SCIENCE—SHOPS

a. Science Instruments

Westinghouse Electric Corporation	**F a/1**
The Eaton-Dikeman Co.	**F a/2**
Corning Glass Works	F 7
American Optical Company	F 8, 9
General Electric Company, Apparatus Sales Division	F 10-16
Federal Electric Products Co.	F 17
Alberene Stone Corporation of Virginia	F 18
Weston Electrical Instrument Corporation	F 19-22
Klett Manufacturing Co.	F 24, 25

b. Laboratory Furniture

Maurice A. Knight	**F b/1**
Kewaunee Manufacturing Co.	F 23
Laboratory Furniture Co., Inc.	F 26, 27
Metalab Equipment Corp.	F 28, 29
John E. Sjostrom Company, Inc.	F 30
The United States Stoneware Co.	F 31
Lord & Burnham	F 32

c. Shop Equipment

The Tolerton Company	**F c/1**
The Columbian Vise & Mfg. Co.	F 33
Greenlee Tool Co.	F 34
The Lufkin Rule Co.	F 35
Millers Falls Company	F 36
Stanley Tools	F 37
The L. S. Starrett Company	F 38
Brown & Sharpe Mfg. Co.	F 39-42
The Cincinnati Milling Machine Co., Cincinnati Grinders Incorporated	F 43, 44
The Black & Decker Mfg. Co.	F 45
Atlas Press Company	F 46, 47
Cincinnati Lathe & Tool Co.	F 48, 49
Duro Metal Products Company	F 50
Haag Machine Company, Inc.	F 51
The R. K. LeBlond Machine Tool Co.	F 52
Logan Engineering Company	F 53
Niagara Machine & Tool Works	F 54
Oliver Machinery Company	F 55
Shopmaster, Inc.	F 56
South Bend Lathe Works	F 57
Walker-Turner Div., Kearney & Trecker Corp.	F 58, 59
Standard Pressed Steel Co.	F 60
Electrikiln Div., The Harrop Ceramic Service Co.	F 61
Pereny Equipment Company	F 62

d. Lockers and Locks

Republic Steel, Berger Manufacturing Div.	F 63
Lyon Metal Products, Inc.	F 64, 65
Fred Medart Products, Inc.	F 66, 67
Penn Metal Corporation of Penna.	F 68, 69
The Interior Steel Equipment Co.	F 70
Star Steel Equipment Co., Inc.	F 71
Dudley Lock Corporation	F 72
Master Lock Company	F 73
National Lock Company	F 74



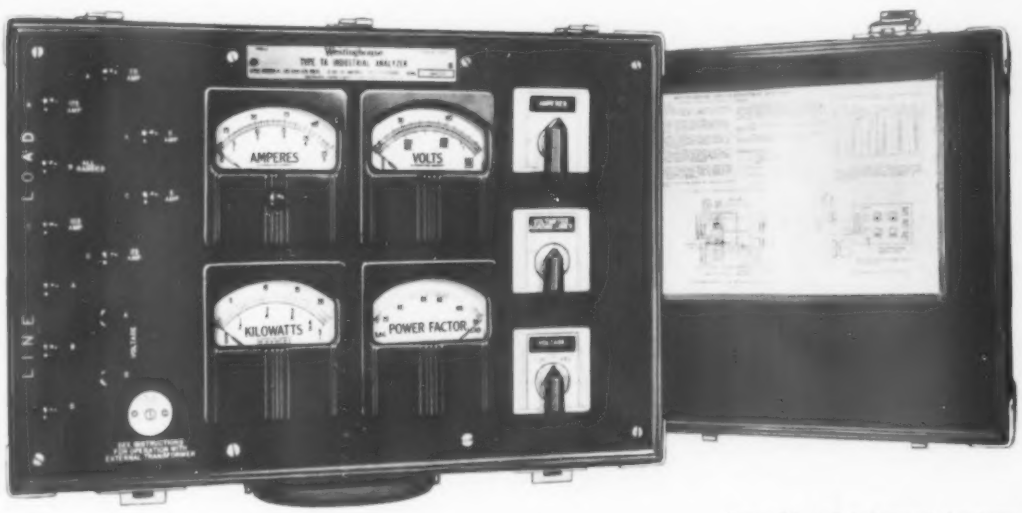
WESTINGHOUSE LABORATORY INSTRUMENTS

for college and university use

Westinghouse electrical instruments meet the exacting needs of university and college laboratories for scientific instruction . . . long life . . . accuracy . . . diversified application.

Illustrated and discussed here is a representative selection of electrical measuring instruments: portable, switchboard and panel types, recorders, shunts, resistors and portable transformers. For more detailed information and for recommended lists of instruments for various kinds of laboratories, call your nearest Westinghouse office or write for Catalog 190 and other literature, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

ANALYZERS — type TA • accuracy: ammeter, voltmeter, 1%; wattmeter, 2%



Type TA A-C Industrial Analyzer

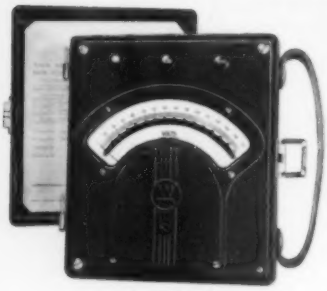
The Westinghouse Type TA Industrial Analyzer is for a-c circuits and measures volts, amperes, watts, and power factor. It incorporates in one compact, portable case all instruments, current transformers and voltage multipliers necessary to obtain complete operating data of alternating current circuits up to 600 volts, 125 amperes. It is self-contained, eliminating the need for carrying individual instruments and accessories to the job. Analyzer simply connects between power service and the apparatus under test. Switches permit shifting ammeter and voltmeter to check all lines of a three-phase circuit under load. Instruments are placed close together to permit accurate, almost simultaneous readings.

(For Complete Ordering Information, See Catalog Section 43-100)

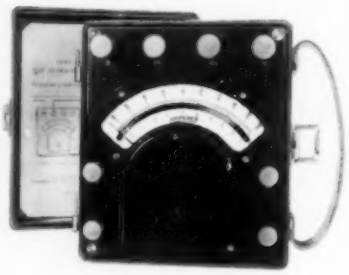
WESTINGHOUSE LABORATORY INSTRUMENTS

PORTABLE INSTRUMENTS

type P-5 line • accuracy ½ %



Type PX-5
D-C Voltmeter



Type PA-5
A-C Ammeter

The Type P-5 Series of Westinghouse instruments can withstand the severe portable service of constant laboratory use, and still maintain the highest degree of accuracy over long periods of time. The combination of high-grade mirrored dials and knife-edge pointers eliminates parallax and assures accurate reading. *Scale length is* 5 inches, and divisions are arranged to aid quick reading. Maximum versatility is achieved with multi-range scale, some of which incorporate seven ranges. Stray magnetic fields do not impair accuracy. *Movements* are mounted on moulded face plate for quick, easy dismantling for inspection and study in the classroom or laboratory. *Pre-aged Moldarta case* does not warp or deteriorate from age, hard service or weather conditions.

full scale range of standard ratings

types PA-5 and PY-5 for a-c		type PX-5 for d-c	
AMMETERS	0-.5 to 0-200	AMMETERS	0-.05 to 0-50
MILLIAMMETERS	0-10 to 0-750	MILLIAMMETERS	0-.03 to 3,0000
VOLT-AMMETERS	0-75 to 0-750 volts 0-1 to 0-25 amps	MICROAMMETERS VOLT-AMMETERS	0-10 to 0-750 0-3 to 0-150 volts 0-0.3 to 0-30 amps
VOLTMETERS	0-3 to 0-750		
WATTMETERS	0-20 to 0-30,000	MILLIVOLTMETERS	0-2 to 0-2,000
		VOLTMETERS	0-1 to 0-1500

(For Complete Ordering Information, See Catalog Section 43-100)

type P-4 line • accuracy ¾ %



Type PX-4
D-C Double-range
Voltmeter



Type PY-4
A-C Triple-range
Voltmeter

The Type P-4 Westinghouse line of portable instruments is designed for operating convenience. (Case measures only 4½"x 4½"x 2".) They may be easily dissembled for inspection and classroom instruction, and are well adapted for laboratory work. *Lightweight:* a-c instruments weigh only 2 pounds; d-c instruments, 3 to 4 pounds. *Moldarta Case* is lightweight, non-warping, weather-resisting.

full scale range of standard ratings

type PY-4 for a-c	type PX-4 for d-c (Also Radio-frequency and rectifier Types)			
AMMETERS	AMMETERS	0-.25 to 0-300	VOLTMETERS	0-1 to 0-750
0-1 to 0-50	Radio frequency	0-.5 to 0-20	Rectifier type	0-.5 to 0-150
MILLIAMMETERS	MILLIAMMETERS	0-1 to 0-3,000	MILLIVOLTMETERS	0-2 to 0-100
0-5 to 0-750	Radio frequency	0-75 to 0-800	VOLT-AMMETERS	0-1.5 to 0-150 volts
VOLTMETERS	Rectifier type	0-1.5 to 0-20		0-.15 to 0-60 amperes
0-1 to 0-750	MICROAMMETERS	0-25 to 0-1,000		
	Rectifier type	0-500		

(For Complete Ordering Information, See Catalog Section 43-100)

SWITCHBOARD INSTRUMENTS

type 24 line • accuracy 1%



Type K-24 circular scale
D-C Ammeter

4½" Class — Circular Scale, Rectangular Front—Round-body Case for Flush Mounting. Because of its extra-long scale, the 24-Line instrument combines high readability with minimum panel space requirements, particularly useful where panel area is at a premium. The pointer travel gives a scale length more than twice as long as other types which require the same panel space.

type 25 line • accuracy 1%



Type K-25
flush-mounting
A-C Voltmeter

6" Class — Rectangular Case — Flush or Projection Mounting—Optional Internal Illumination. Westinghouse 25-Line instruments meet the requirements of many special installations. Simplicity of design, uniform appearance, interchangeability and availability of movements for any measurements, make this instrument especially suited for modernization as well as for new installations. All terminals are mounted near the vertical center line, permitting instruments to be mounted near the edge of a panel without interfering with supporting posts and wiring channels.

full scale range of standard ratings—24 and 25 lines

direct current	alternating current
Ammeters—0-1 to 0-50 (self-contained)	Ammeters (24 line)—0-1 to 0-20 (self-contained)
Ammeters for use with shunts—0-50 or 0-100 millivolts	(25 line)—0-1 to 0-50 (self-contained)
Voltmeters—0-2 to 0-800 (self-contained)	Ammeters for use with transformers—0-5
Milliammeters—0-1 to 0-500	Voltmeters (24 line)—0-150 to 0-600 (self-contained)
Wattmeters—120 or 240 volts, 0-50 or 0-100 millivolts for external shunts. (25 line only)	(25 line)—0-15 to 0-800 (self contained)
	Voltmeters for use with transformers—150
	Wattmeters for use with transformers—5 amperes—12 volts
	Synchroscopes—120 volts
	Power Factor meters—5 amperes, 120 volts, 0-1-0 scale
	Frequency meters (24 line)—120 volts, 60 cycles
	(25 line)—120 volts, 25 or 60 cycles

(For Complete Ordering Information, See Catalog Section 43-200)

for college and university use

type P-14 line • accuracy 1%



Type PX-14 open-face model. A separate binding post is provided for each range of a multi-range scale



Hinged cover, optional on either PX-14 or PA-14 models, assures full protection

The Type P-14 portable instrument includes the features of the larger portables, including magnetic shielding, plus the added advantages of extremely light weight and smaller overall dimensions. Its accuracy, versatility and low cost make it ideal for field and radio testing, and for general student laboratory work. *Maximum Versatility:* Up to 4 voltage ranges or 4 current ranges available with multi-range scales. Combinations such as three current and three voltage ranges in the same instrument make this one of the most versatile instruments available. *Maximum Portability:* Measuring only 5¼" x 4¼" x 2½", both the hinged cover type and the open-face model are small enough to fit a pocket. *High Overload Capacity:* Type P-14 instruments will withstand exceptionally high overload shocks.

full scale range of standard ratings

type PA-14 for alternating current		type PX-14 for direct current	
VOLTMETERS	0-1.5 to 0-750	VOLTMETERS	0-.75 to 0-800
AMMETERS	0-.5 to 0-50	MILLIVOLTMETERS	0-10 to 0-5,000
MILLIAMMETERS	0-5 to 0-500	AMMETERS	0-.5 to 0-50
Also available in rectifier and thermocouple types.		MILLIAMMETERS	0-1 to 0-2,000
		MICROAMMETERS	0-20 to 0-5,000

(For Complete Ordering Information, See Catalog Section 43-100)

type P-12 line • accuracy 2%



Type PA-12
A-C Voltmeter

The Type P-12 line includes single and multiple range ratings for complete D-C and A-C currents and voltage measurements. It meets all the performance requirements, including shielding, insulation, etc., required for 2% portable instrumentsin A.S.A. C39.1. Although it is the smallest and lowest cost of the Westinghouse portable instrument lines, it provides the same high degree of reliability, overload capacity and range coverage that are contained in the larger types.

Lightweight:
A-C instruments, weight from 1 to 1½ pounds
D-C instruments, weight from 1½ to 2 pounds

Pocket Size:
A-C — 4¼"x 3¼"x 2 7/16"
D-C — 4¼"x 3¼"x 1¾"

full scale range of standard ratings

type PA-12 for alternating current	type PX-12 for direct current
Self Contained Current—From 5 milliamperes to 50 amperes	Self Contained Current—From 20 microamperes to 50 amperes
Self Contained Voltage—From 1.5 volts to 300 volts	Self Contained Voltage—From 10 millivolts to 800 volts
Also available in rectifier types.	

(For Complete Ordering Information, See Catalog Section 43-100)

PANEL INSTRUMENTS

type 33 line • accuracy 1%



Type N-33
flush-mounting
wide flange

2½" Class — Scale Lengths, 1.5" to 1.8". Five flush mounting types of cases are available: the American War Standard; the round, wide-flange instrument; the round, narrow-flange type; the rectangular type. Projection mounted instruments also are available in round case. Cases are interchangeable.

type 35 line • accuracy 2%



Type N-35
flush-mounting

3½" Class — Scale Lengths, 2.06" to 2.4". Available as a complete line in five types of cases and mounting covering all laboratory, industry and radio applications. The ratings cover the broadest field consistent with prevailing requirements for instruments of this class. Cases are interchangeable without adapters.

type 37 line • accuracy 2%



Type N-37
flush-mounting

4½" Class — Scale Lengths, 2.8" to 3.2". The largest of the panel instruments. The self-contained ratings cover the broadest possible field for this class of instruments. Higher ratings may be obtained by using external resistors, shunts or transformers. Five types of cases are interchangeable throughout the line.

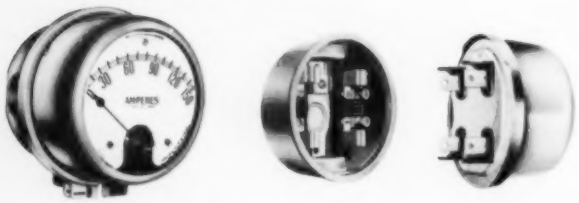
full scale range of standard ratings—types 33-35-37

direct current	alternating current
Ammeters—0-1 to 0-50	Ammeters (for frequencies of 15 to 500 cycles)—0-1 to 0-50
Milliammeters—0-1 to 0-800	Radio Frequency—0-1 to 0-20
Microammeters—0-20 to 0-800	Milliammeters (for frequencies of 15 to 500 cycles)—0.5 to 0-500
Voltmeters—0-1 to 0-800	Rectifier—0-1 to 0-10
Millivoltmeters—0-10 to 0-500	Radio Frequency—0-10 to 0-800
	Microammeters—Rectifier—0-100 to 0-500
	Voltmeters (for frequencies of 25 to 125 cycles)—0-1.5 to 0-800
	Rectifier—0-3 to 0-300
	DB Meters—Rectifier—Standard Scales

(For Complete Ordering Information, See Catalog Section 43-300)

LABORATORY INSTRUMENTS

SOCKET INSTRUMENTS — type E line • accuracy 1%



Type E, showing simple but positive connection by plugs

Type E socket instruments provide a low cost means of checking load and machinery operation. One instrument can be used to check circuits at a number of places. Sockets may be mounted directly on conduits. After socket is installed, instruments may be plugged in or replaced quickly. Scale is 5¼", with bold figures and target pointers to make reading easy at a distance. Temporary overloads do not harm the movement; no short-circuiting connections are necessary.

(For Complete Information, See Catalog Section 43-600)

RECORDING INSTRUMENTS

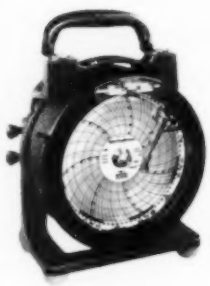


Type G-40 Recorder for Portable Service

TYPE G-40 DIRECT ACTING STRIP CHART RECORDER (Accuracy 1%)

Perfection of detail in chart drive, chart reroll, chart threading and inking system, makes Type G-40 Recorders easier to operate and has removed many causes of lost records. Available for switchboard or portable applications.

The chart and clock mechanism are readily removable without disturbing the instrument-movement or any connections to the instrument. Recording pen has a long-wearing, platinum-iridium point. Chart has double perforations for positive traction on driving drum. Accurate synchronous motor clock, furnishes drive power for chart. Chart speeds of ¾", 1½", 3" or 6" per hour or per minute.



Type A Recorder for portable mounting

TYPE A ROUND CHART RECORDER (Accuracy 2%)

A low first-cost, low-maintenance instrument for a variety of applications where chart records of 2% accuracy are adequate for their purpose. Extra-sturdy construction makes this a convenient instrument for miscellaneous jobs. Portable, switchboard mounting, wall mounting or detachable socket-mounting cases are available. Scale length is 2 inches, but voltmeter charts have suppressed zero scale with divisions comparable in size and readability to those of much longer scales. Charts are available for 24 hour, 3 day or 7 day operation. High-grade paper used makes charts stay flat.

(For Complete Ordering Information, See Catalog Section 43-400)

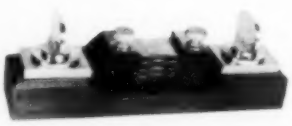
AUXILIARY EQUIPMENT

SECTIONAL TUBULAR RESISTORS for D-C instruments



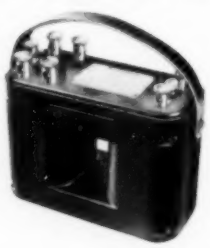
The sectional construction of these resistors permits a wide range of accurate measurements of high voltages with one milliampere instruments. Resistance values ¼, ½, ¾ or 1 megohm are standard, and combinations of these are used to form the complete unit. They are designed for panel mounting or portable use.

TYPE G AND GG SHUNTS for D-C Measurement



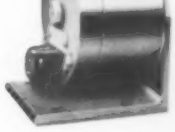
Type G and GG shunts provide a complete line for use with indicating or recording instruments for measuring direct currents beyond the range of self-contained instruments. Accuracy is maintained by special manganin alloy strips which are unaffected by temperature. Portable and switchboard types are available in 50 and 100 millivolt sizes with many different current ratings.

PORTABLE POTENTIAL AND CURRENT TRANSFORMERS



For measuring electrical quantities greater than the self-contained ranges for which the instruments are rated, these portable pontential and current transformers offer a convenient and accurate means of increasing instrument usefulness. High overload capacity of multiple ration current transformers permit safe use of continuous loads up to 200%. Potential transformers, available with three primary ratings, can be loaded safely up to several hundred percent.

TYPE A-80 NONSPARKING A-C TACHOMETER



Type A-80 tachometer combines an induction type generator and a rectifier indicating instrument. It has no commutator and no brushes. Sealed-in-type bearings, which require no lubrication for life, practically eliminates maintenance and assure trouble-free performance.

(For Complete Ordering Information, See Catalog Section 43-800)

WESTINGHOUSE ELECTRIC CORPORATION
P. O. BOX 868 **PITTSBURGH 30, PA.**
B-5938-B
13-6 - 354
Printed in U.S.A.

The EATON-DIKEMAN Co.

FILTERTOWN, MOUNT HOLLY SPRINGS, PA.

E&D LAB-PAK 200 is the newest package for filter circles, 200 per box. Grades 612, 613, 615, 619 and 620 are now packed in LAB-PAK 200. Sizes from 7.5 to 25.5 cm.

LAB-PAK 200



Fa/2

E&D filter papers are famous for dependable uniformity. They are qualitative (non-acid washed) low ash content papers: neutral and substantially free of solubles. The Eaton-Dikeman Company manufactures more than 60 regular grades, and 40 special grades in a wide variety of sizes, shapes and combinations. E&D filter papers cover virtually the entire field of liquid filtration.

FILTER PAPERS FOR LABORATORY USE

	Thickness (In.)	Basis Wght. (Lb.)	Surface	Color	Rapidity	Wet Strength
1	.0065	20	Embossed	White	80	4.5
4	.007	22	Smooth	White	110	5.0
5	.007	24	Smooth	White	60	5.5
7	.0065	20	Smooth	White	170	4.2
048	.007	25	Smooth	White	30	6.5
248	.0065	25	Smooth	White	15	6.5
612	.008	20	Embossed	White	60	4.5
613	.006	20	Smooth	White	60	4.8
615	.010	20	Creped	White	225	4.5
619	.011	20	Creped	Grey	275	4.5
620	.008	20	Embossed	Grey	65	4.5

Many E&D filter papers are now made with High Wet Strength thus greatly expanding their usefulness and practical application.

E&D

Available from your E&D distributor in all principal cities of the U.S. Write for free samples and name of your nearest supplier.

This advertisement is printed on Grade #615. It is extensively used in funnel work. Also used in low or medium pressure presses for filtering edible oils, fish oils, medicinal oils, soaps, waxes, pharmaceuticals, fruit juices, cereal products, chocolate, sugar, malt syrup and extract. When made with High Wet Strength this grade is designated #915.

FILTER PAPERS FOR SCIENCE AND INDUSTRY since 1890!

Made by the *only* company in America exclusively engaged in the manufacture of filter papers.

ACID PROOF

KNIGHT-WARE

LABORATORY EQUIPMENT

HAT KNIGHT-WARE IS

Knight-Ware is an improved ceramic product having a tight, fine-grained body which is tough, uniform, thoroughly vitrified and wholly inert to the action of acids, alkalis, chemicals and corrosive solutions and gases, weak or strong, hot or cold. Its acid-proof qualities do not depend upon any glaze, enamel or cover. "It is the body itself."

Knight-Ware is light weight yet mechanically strong, and is affected only by glass or fused silica for acid resistance.

A typical specification should read, "All parts of plumbing and ventilating system subject to the action of chemical wastes, fumes or chemical corrosion shall be of Knight-Ware as manufactured by Maurice A. Knight of Akron, Ohio."

ware Used

Knight-Ware Laboratory Sinks, Table Troughs, Sumps and Tubing are used in school, university and commercial laboratories, hospitals, in newspaper buildings and wherever acid-proof waste or ventilating lines are necessary.

Knight-Ware Plant Equipment is used by the manufacturer in the use of chemicals, and in processes where contamination must be avoided.

ypical KNIGHT-WARE Installations

...ngton
...n University
...ette College
...n University
...n Mawr College
...mbia University
...a University
...n Hopkins
...sas City University
...outh
...ell University
...w York University
...Western Technical Institute
...o State University
...n State University
...ston University
...ia University
...ia University
...ersity of Arkansas
...ersity of California
...ersity of Southern California
...ersity of Cincinnati
...ersity of Detroit
...ersity of Washington
...ington University
...sley College
...t Virginia University

...thala
...l Memorial
...mbia Presbyterian Medical
...w York Cornell Medical Center

Research Institutes
Battelle Memorial
Mellon Institute

Publishing
Washington Post
Philadelphia Inquirer
Art Gravure Building of New York
Cleveland Plain Dealer
Crowell-Collier Publishing Co.
Hearst Publishing Co. Bldg. of New York
New York Daily Mirror Bldg.
New York Herald Tribune Bldg.
United States Goverment Bureau of Engraving and Printing

Industrial
Abbott Laboratories
Merck Company
American Viscose
Canadian Industries, Ltd.
Firestone Research
Ford Motor Co.
General Electric Co.
Goodyear Tire & Rubber Co.
The Sterling Drug Co.
Western Electric Co.
G. D. Searle & Company
Parke, Davis & Company
Hoffman-La Roche, Inc.



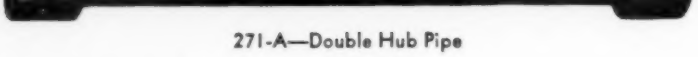
MAURICE A. KNIGHT • AKRON 9, OHIO

ACID WASTE-PIPE AND FITTINGS

Knight-Ware Bell and spigot pipe and fittings are available in any bore from 1 up to 60 in. in any lengths up to 5 ft. Special fittings for unusual places or to eliminate unnecessary joints are furnished at no great increase in cost. Flanged or plain ground end connections can be furnished where desired.

Knight-Ware Acid-Proof Traps supply their own liquid seal when in use, and thus prevent or minimize the escape of gases from the waste system.

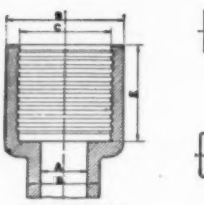
Knight-Ware B&S joints packed and poured to our specifications are absolutely acid and leak proof. Installation is no more difficult than with ordinary cast iron pipe.



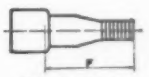
271-A—Double Hub Pipe

271 and 271-A—Single and Double Hub Pipe

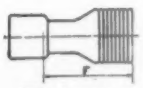
Supplied in bores up to 12 inches—larger if desired. In large installations, 10 to 15 per cent of the straight lengths should be of the Double Hub type, so when it is necessary to cut pipe, both pieces may be utilized. All hubs are deep—and both hub and spigot ends are well corrugated to insure a leak-tight joint.



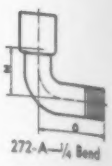
Detail of Hub



276—Reducer



277—Increaser



272-A—¼ Bend

272-B—⅛ Bend

271—Single Hub Pipe

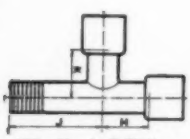
A in.	D in.	Lgth. feet	271 Wt. per ft.
1	1⅝	1 to 3	2¼
1½	2¼	1 to 5	3¼
2	2¾	1 to 5	4
3	4	1 to 5	5½
4	5	1 to 5	8½
5	6	1 to 5	11
6	7¼	1 to 6	15
8	9½	1 to 6	20
9	10½	1 to 6	24
10	11¾	1 to 6	28
12	13¾	1 to 6	36

272-A and 272-B

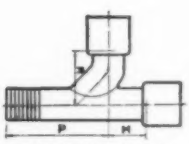
Bore in.	N in.	O in.	Wt. lbs.
1	4	8	2½
1½	4	8	3½
2	4	8	4½
3	4	8	8½
4	6	10	12¾
5	6	10	17
6	6	10	23
8	10	14	40
9	10	14	48
10	10	14	56
12	12	16	84



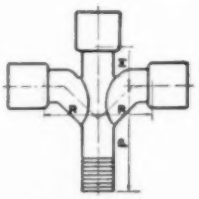
272-D—Twin Elbow



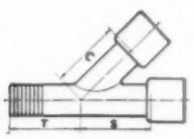
273—Single T-Fitting



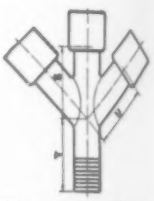
273-A—Single T-Y



273-B—Double T-Y

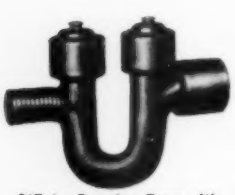


274—Single Y

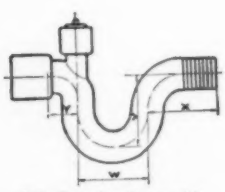


274-A—Double Y Fitting

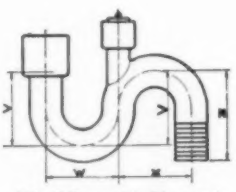
Bore in	N in.	O in.	272-D Wt. lbs.	Bores in.	J in.	H in.	K in.	273 Wt. lbs.	P in.	M in.	R in.	273-A Wt. lbs.	273-B Wt. lbs.	S in.	T in.	U in.	274 Wt. lbs.	274-A Wt. lbs.
1	4	8	4½	1x1	8	4	3	5	8¾	3¼	3	5	6	6	6	6	5	7½
1½	4	8	6	1½x1½	8	4	3	8	8¾	3¼	3	6	7	6	6	6	8	10½
2	4	8	7	2x2	8	4	4	10	8¾	3¼	3	8	8½	6	6	6	10	12
3	4	8	11	3x3	8	4	4	13	8¾	3¼	4	10	12	8	8	8	12	15
4	6	10	20	4x4	12	6	5	23	13¼	4¾	6	23	28	10	8	10	22	27
5	6	10	29	5x5	12	6	5	30	13¼	4¾	7	27	38	12	9	12	30	36
6	6	10	36	6x6	12	6	6	34	13¼	4¾	8	35	52	12	9	12	42	47
8	10	14	55	8x8	14	10	8	60	16	8	12	64	85	16	12	16	73	80
9	10	14	72	9x9	14	10	9	72	18	8	12	85	105	18	12	18	95	105
10	10	14	90	10x10	14	10	10	85	18	8	14	110	110	20	12	20	110	125
12	12	16	125	12x12	14	10	12	105	18	9	14	125	140	22	12	22	150	185



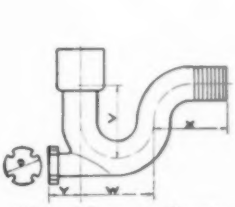
267-A—Running Trap with 2 Cleanouts



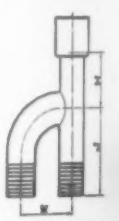
267—Running Trap with Single Cleanout and One Plug



268—S Trap with Cleanout



269-A—P Trap with Flange Cleanout



273-E—Vent T Fitting

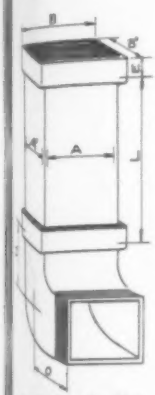
Bore in.	V in.	W in.	X in.	Y in.	267 Wt. lbs.	267-A Wt. lbs.	V in.	W in.	X in.	Z in.	268 Wt. lbs.	D in.	V in.	W in.	X in.	Y in.	269-A Wt. lbs.	Bores in.	J in.	H in.	K in.	273-E Wt. lbs.
1	4	4	6	3	7	8	4	4	4	5	6½	4	4	4	6	2¼	5	1x1	8	4	4½	4
1½	6	6	6	3	8	10	6	6	6	7¼	7½	4	6	6	6	3¼	8	1½x1½	8	4	5½	8
2	6	6	7	4	15	17	6	6	6	7½	14	4	6	6	7	3½	11	2x2	8	4	5¾	10
3	8	8	8	4	20	25	8	8	8	10	19	5	8	8	8	4½	21	3x3	8	4	7	13
4	9	9	9	5	35	40	9	9	9	11½	30	5	9	9	9	5	30	4x4	12	6	8½	22
5	9	9	10	5	44	58	9	9	9	12	42	5	9	9	10	5¾	43	5x5	12	6	10½	32
6	10	10	10	6	58	63	10	10	10	14	52	5	10	10	10	6½	52	6x6	12	6	11½	48
8	15	15	12	8	100	112	15	15	15	20	95	6	15	15	12	7	95	8x8	14	10	13½	73
9	16	16	14	8½	130	138	16	16	16	22	125	6	16	16	12	8½	130	9x9	14	10	15	90
10	18	18	14	9	155	165	18	18	18	24	150	6	18	18	14	9	148	10x10	14	10	16	100
12	20	20	18	10	220	235	20	20	20	26	220	6	20	20	18	10	220	12x12	14	10	19	120

VENTILATING EQUIPMENT

Protection against acid and other corrosive gases or fumes in the installation of ventilating pipes and fittings may be even more important than in the case of laboratory waste and drainage lines. Vent lines are often built solidly into walls as a permanent installation. Repair or replacement, due to corrosion caused by a leaking ventilating system, may therefore be serious and costly.

A ventilating system acts as a huge condenser for the acid fumes, which are collected in the form of highly concentrated acids or chemicals without possibility of dilution or drainage. That is why leading colleges, universities, high schools, hospitals and commercial laboratories—built for permanence—specify Knight-Ware Acid-Proof Ventilating Pipes and Fittings.

Knight-Ware Ventilating Pipes and Fittings will permanently withstand any acid, alkali or corrosive—hot or cold—weak or strong—hydrofluoric acid alone excepted. Knight-Ware Ventilating Pipes and Fittings should be ordered the same as Waste Lines and Fittings—referring, if possible, to figure numbers in Tables as shown below, also dimensions, including sketches or blueprints of special fittings.



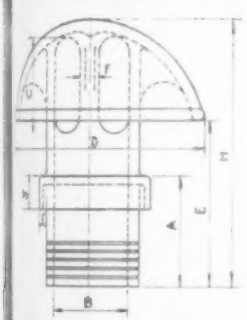
351—Rectangular Pipe and Elbow

Round and Rectangular Ventilating Pipes and Elbows

Either round or rectangular Knight-Ware Acid-Proof Ventilating Pipe and fittings can be furnished in the various sizes as given in the Tables at right. Special sizes and dimensions are also available. Blueprints and sketches must accompany your order for special piping.

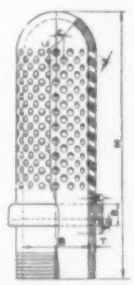
When ventilating pipe must be installed in spaces too limited for regular socket joints, we supply a ventilating pipe with plain, ground butt-ends for banded joints. These are made in standard sizes as well as for special requirements.

Ventilating Roof Caps—Two Types



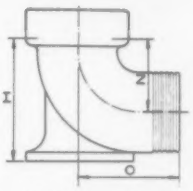
353—Ventilating Roof Cap

Illustrated are two kinds of Knight-Ware Ventilating Roof Caps, although we can furnish other types. Types shown are made to exclude rain, snow, etc. Combined area of openings exceeds three times cross-sectional area of cap, which provides ample security against back-pressure. Note provision made for flashing.



352 Ventilating Roof Cap

Base Elbows for Ventilating Pipe



272-AB—Base Elbow

A Base Elbow is used to start off a ventilating line from a hood. Special designs can be furnished. Both right and left offset types such as shown in picture on page 4 can also be furnished.

For Dimensions in Table of Round Pipe See Details of Hub on Page Two

A in.	D in.	C in.	B in.	E in.	L ft.	271 Round Wt. per ft.
10	11¾	13¼	15	4	1 to 5	28
12	13¾	15¼	17	4	1 to 5	36
15	17	19¼	21	4	1 to 5	45
18	20	22¼	24½	4	1 to 5	70
20	22	24½	26½	4	1 to 5	80
24	26½	28½	30½	4	1 to 4	95
27	29½	31¾	33¾	4	1 to 4	110
30	32½	34¾	36¾	4	1 to 4	120

A_1 in.	A in.	B_1 in.	B in.	E in.	L ft.	N in.	O in.	351 Rect. Wt. per ft.
8	12	13½	17½	4	1 to 5	10	16	33
10	15	15½	20½	4	1 to 5	10	16	45
12	18	18	24	4	1 to 5	12	18	60
15	20	21	26	4	1 to 5	14	20	95
18	24	24	30	4	1 to 5	16	22	140
20	30	26	36	4	1 to 4	18	24	165

B in.	C in.	D in.	E in.	F in.	G in.	H in.	J in.	T in.	352 Wt. lbs.
6	¾	3	1	½	¾	30	¾	¾	45
8	1	3	1	½	1	30	¾	¾	60
9	1	3	1	½	1	36	1	1	80
10	1	3	1	½	1	36	1	1	90
12	1	3	1	½	1	36	1	1	115

A in.	B in.	C in.	D in.	E in.	F in.	H in.	353 Wt. lbs.
10	6	7	16	17	1½	24	60
10	8	7	22	16	2	24	80
10	9	8	24	15	2¼	24	100
10	10	9	26	14	2½	24	120
10	12	10	30	12	3	24	145

ACID-PROOF FLOORING

PERMANITE Floors are superior to wood, concrete or ordinary acid-proof flooring. They are constructed of special non-skid vitrified brick bonded by PERMANITE cement.

These floors are designed for rugged endurance as well as for acid resistance. They are impervious to strong alkali cleaners, oils, fats and greases as well as most acids. PERMANITE Floors are easily cleaned and will withstand steam sterilization without softening. Recommended for laboratories, food processing plants, metal plating rooms and chemical plants.



Permanite floor of non-skid, vitrified brick and Permanite cement

KNIGHT-WARE

LABORATORY EQUIPMENT

KNIGHT-WARE SUMPS

We supply two types of Knight-Ware Sumps and Dilution Basins. The smaller Type "B" has only one inlet, while the larger Type "A" may have several at any desired position. Cover on "B," in either flat or dome shaped style, is provided with bolt holes. Cover for "A" can be furnished flanged if preferred.

400 — Style "A" Sumps

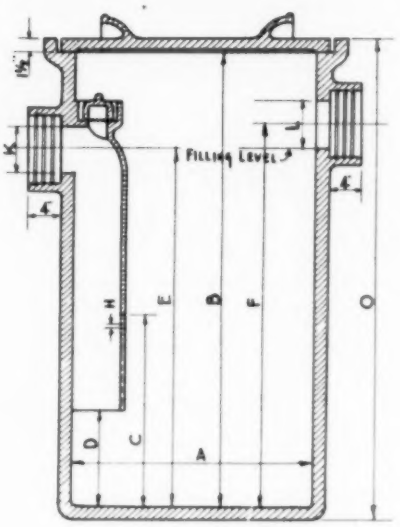
A in.	B in.	C in.	D in.	E in.	F in.	H in.	K in.	L in.	O in.	Weight lbs.
30	57	24	12	45	48	½	4-6	4-6	60	700
36	75½	36	12	57	60	½	4-6	4-6	78½	1100

(All Dimensions Are In Inches)

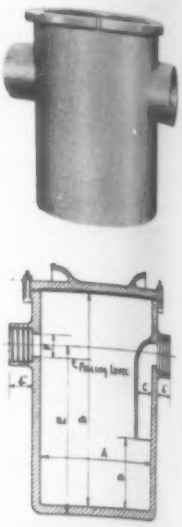
401 — Style "B" Sumps

A in.	B in.	C in.	D in.	E in.	F in.	Weight lbs.
12	12	2	3	8	2	75
18½	24	3	12	17	3	175
24	36	4	12	28	4	400

(All Dimensions Are In Inches)



400—Style "A" Sumps

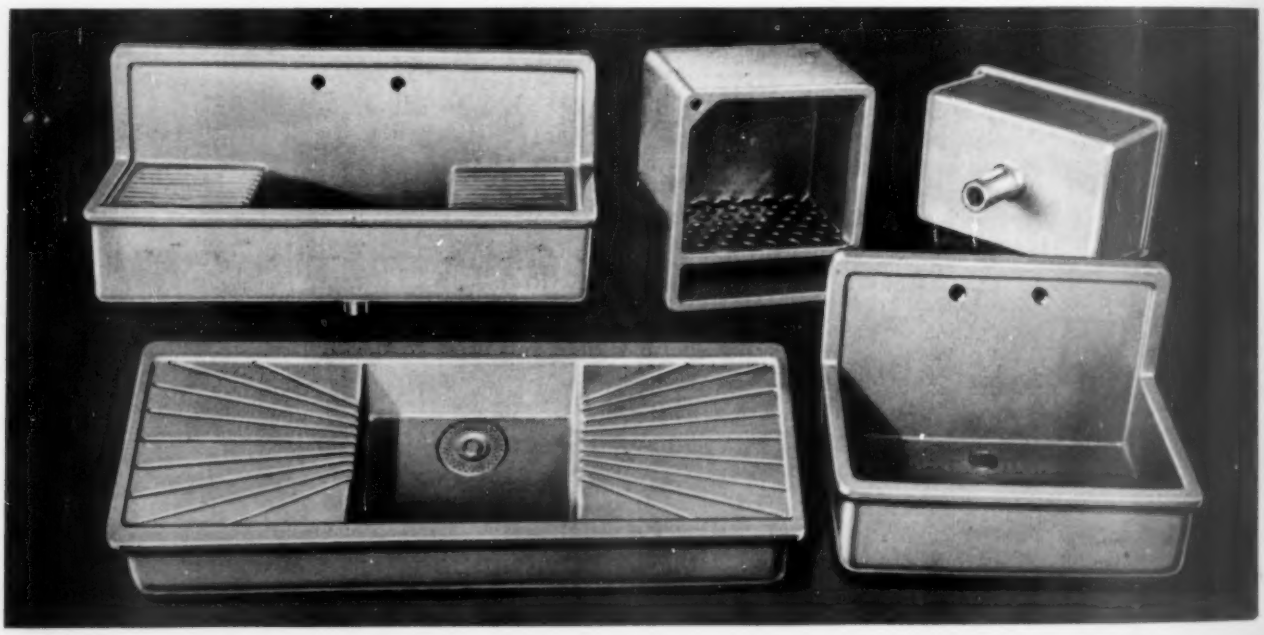


401—Style "B" Sumps

KNIGHT-WARE SINKS

Knight-Ware Laboratory Sinks are custom built to suit your requirements. Because they are entirely handmade, it costs no more for this service. The one-piece construction, smooth surfaces, rounded corners and acid-proof quality mean a freedom from leaks and a cleanliness that is permanent. Outlets of various designs, back, drainboards and apron are optional as an integral part of sink.

Please submit sketch and dimensions when requesting quotation on sinks or tanks. *Complete catalog will be sent on request.*



MAURICE A. KNIGHT • AKRON 9, OHIO

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PYREX BRAND • VYCOR BRAND • CORNING BRAND LABORATORY GLASSWARE

For Maximum Economy

These three famous brands of laboratory glassware meet a wide variety of requirements. Each is so balanced that the properties essential for economy, accuracy and durability are combined and maintained at their maximum value.

PYREX brand laboratory ware stands up longer under student abuse than any other brand. The low coefficient of expansion of PYREX brand glass No. 7740 (0.0000032 between 19-350°C.) minimizes loss from thermal shock, permits heavy, rugged construction for additional mechanical strength. This plus its exceptional resistance to chemical corrosion provides the best all-around glass for usual laboratory applications.

VYCOR brand laboratory glassware is recommended for the exceptional laboratory problem in which exceedingly high resistance to thermal shock or chemical stability is required. With a silica content of 96%, its thermal resistance and chemical stability toward acid and neutral solutions are the highest of any glass except fused silica.

CORNING brand laboratory glassware is made of boron-free glass No. 7280 which is usually resistant to alkalies. It has long proved its economy and serviceability under many laboratory conditions.

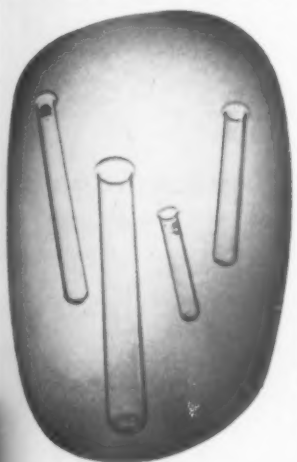
AVAILABILITY—PYREX brand, VYCOR brand, and CORNING brand laboratory glassware is stocked by your laboratory dealer. Call him today.



1.
PYREX brand West-Type Condensers—Designed for rough service. Bulbs at outlets protect condenser tube, permit stronger seal to outlet. Smaller jacket speeds water flow. Hand-tooled outlets on same side for convenience.



2.
PYREX brand Reagent Bottles—Permanent red glass labels for quick easy reading. High chemical stability for protection of standard solution. Special labels available without mold charge.



3.
PYREX brand Test Tubes—Proved by careful school records the most serviceable you can buy. Made from accurately drawn tubing, annealed for strength. Available with and without rims and side arms.



4.
VYCOR brand beakers—Exceptional stability for faster and more accurate analysis under high heat or low temperature.



5.
PYREX brand Fluted Funnels—Specially designed for fast filtration. Flutes impressed into side walls assure proper drainage—eliminate air binding. Beaded rim protects against chipping.



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SCIENTIFIC INSTRUMENTS

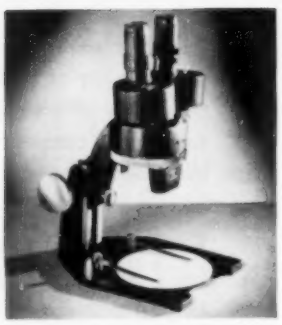
AO SCHOLAR'S MICROSCOPE NO. 78B

Designed to fit student needs and to meet teaching requirements. Built-in light source enables even novices to achieve excellent results. Entire microscope is low for comfortable posture, reverse position of arm and dual cone nosepiece provides clear view of stage and controls. A single gear train adjustment provides rapid, critical focusing. 10X, 43X achromatic objectives, 10X Huygenian eyepiece and stage clips are locked in place.



MICROSCOPE NO. 21X

A Stereoscopic Microscope of highest quality at a moderate price. Provides stereoscopic vision, an image that is upright and a wide field of view. Valuable for examining flowers, plants, insects, molds, minerals. Equipment includes: platen-type stage, double revolving nosepiece with 1.0X and 2.0X paired achromatic objectives, 9X paired wide field eyepieces.



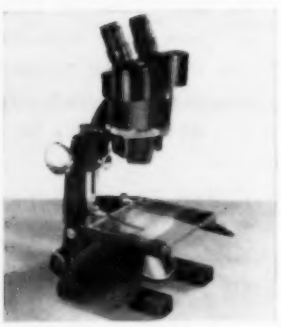
MICROSCOPE NO. 65B

A standard size instrument for school or college laboratories. Features include rack and pinion coarse adjustment with adjustable tension, graduated micrometer-screw type fine adjustment, plain square 125 mm stage, dustproof dual-cone double revolving nosepiece, iris diaphragm, 10X and 43X achromatic objectives, 10X Huygenian eyepiece. Mechanical stage and additional optics may be added later.



MICROSCOPE NO. 25LF

This Stereoscopic Microscope has a square glass stage, removable horse shoe base and mirror for use with transmitted light, triple revolving nosepiece with 1.0X, 2.0X, 3.0X paired achromatic objectives and 9X and 12X paired wide field eyepieces. Other models offer a wide selection of optical and mechanical equipment.



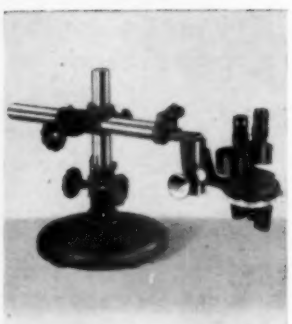
MICROSCOPE NO. 35MH

A versatile instrument for medical and university laboratory work. Features include rack and pinion coarse and graduated micrometer screw-type fine adjustments, 125 mm square bakelite stage with built-on ungraduated "pinch-grip" mechanical stage, fork type focusing substage mount, N.A. 1.25 condenser, dual cone triple revolving nosepiece, 10X, 43X and 97X, achromatic objectives, 5X and 10X Huygenian eyepieces.



MICROSCOPE NO. 23

A Stereoscopic Microscope for examining large objects not conveniently placed on a microscope stage. Ring and swivel mounting of binocular body permits rotation to most convenient position for observation. Elevation device and arm extension permit inspection of large surface areas and objects in a deep dish. A wide range of optics can be supplied.



MICROSCOPE NO. 15MLH

A fine binocular instrument for more critical and extended observation. Binocular body eye-tubes incline 30° for comfortable posture and converge at 8°. Features include rack and pinion coarse and graduated micrometer-screw type fine adjustments, 125 mm square bakelite stage with built-on "pinch-grip" mechanical stage, fork-type focusable substage mount with N.A. 1.25 condenser, dual-cone revolving triple nosepiece, 10X, 43X and 97X achromatic objectives, 5X and 10X Huygenian eyepieces.



MICROSCOPE NO. P45

A simplified polarizing microscope priced within reach of educational budgets, for teaching chemical microscopy, petrography and crystallography. Features include use in reversed position, low height, gear train focusing, built-in light source, Polaroid polarizer and analyzer, graduated revolving metal stage, AO strain-free optics. Body tube accommodates AO compensators, choice of revolving nosepieces.



AMERICAN OPTICAL COMPANY

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AO LABORATORY ILLUMINATOR NO. 710

An economical double-duty illuminator, providing ample light for as many as four microscopes, and for laboratory table work as well. Features a 150 watt, 120 volt clear daylight lamp and an opal glass globe, both inexpensive replacement parts. Supplied with 7 feet of Underwriters' approved cord and plug. Base and shade finished in alcohol-resistant enamel.



DIVIDED CIRCLE SPECTROMETER NO. 10025

Designed for teaching basic optical concepts. Measurements of prism angles, refractive index, dispersion, and wave length can be done with precision. Accessories include a comparison prism for observing two spectra simultaneously, a camera attachment, a choice of three glass prisms, and a hollow prism for use with liquids.



MICROSCOPE ILLUMINATOR NO. 385

A simple, compact illuminator with 10 watt lamp giving ample illumination for most work. For use with or without microscope substage mirror. Sturdy bakelite construction.



PHOTOMICROGRAPHIC CAMERA NO. 662

An important and necessary laboratory tool for photomicrographic work. Sturdy shock absorbed metal base securely clamps microscope and light source in any of three positions. Vertical pillar supports adjustable camera arm, special light tight adapter enables camera arm to be swung in or out of optical path, both 35 mm and 4" x 5" cameras available, each rotates through 360° eliminating need for revolving stage. Supplied with or without telescopic eyepiece, choice of shutters.



MICROSCOPE ILLUMINATOR NO. 349

A compact, powerful light source with variable transformer, for low power inspection, physics experiments, general "spot" illumination. Available with jack-knife standard and base, optical base attachment and adapter rod for ring stand.



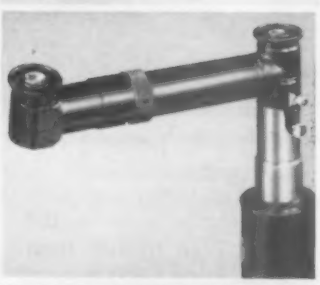
NO. 900 MICROTOME

A table type microtome for the school laboratory with precise hand operated feed. Sections from 5 to 500 microns can be cut with razor or microtome knife. 3⅞" long glass travelways securely support knife beyond the length of cut. Object clamp accommodates mounted specimens up to 1⅛".



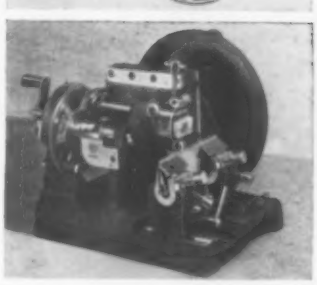
DEMONSTRATION EYEPIECE NO. 434

Replaces the standard microscope eyepiece with widely separated eyepieces through which two persons can view the same field at the same time. Valuable for quizzes and study. A movable pointer is visible in both eyepieces.



MICROTOME NO. 815

A moderately priced instrument with the unique AO Spencer feed mechanism which is independent of the vertical movement. Provides greater feed accuracy and protection from shock. Feeds sections 2 to 40 microns in thickness. Total excursion is 22 mm. Ball and flange type object clamp. Rigid knife holder with adjustable cutting angle.



MICROSCOPE ILLUMINATOR NO. 735

A modern light source with 100 watt lamp, convenient external adjustments for binocular microscopes, bright field, dark field and phase. It is recommended for photomicrography and microprojection. Features rack and pinion focusing, precise tilting, simple reflector adjustment, cool operation, iris diaphragm, and single or multiple filter holders.



MICROTOME NO. 820

The outstanding instrument for critical serial sectioning. Massive and rigidly built. Feed mechanism is independent of vertical movement. Critical setting for thicknesses from one to fifty microns. Total excursion of feed is 28 mm. Ball and flange type object clamp. Double clamp knife holder with wide range of cutting angles.



MAGNIFIERS

Finest quality precision magnifiers in folding chromium plated cases for pocket use. Triple aplanats (three cemented lenses) or doublets (two lenses) in powers of 6X, 10X, or 12X. Utility magnifier with horse shoe base has a 36 mm, 4.5X, 3 lens system in threaded focusing mount.



INSTRUMENT DIVISION • BUFFALO 15, NEW YORK

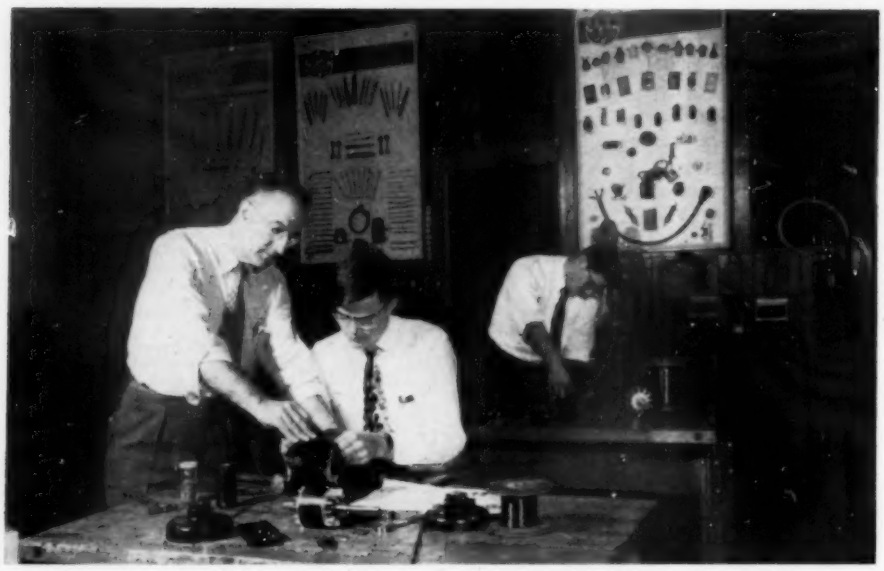
GENERAL ELECTRIC COMPANY

Apparatus Sales Division

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EXPERIENCE in the school laboratory, working with a carefully selected group of well-designed equipment, is invaluable to the student preparing for a career. To assist in this educational process of learning by doing, General Electric offers special equipment for electrical laboratories – equipment developed with the co-operation of many well-qualified educators.

Motor and Generator Construction Kits



Building standard commercial motors gives students actual experience with motor design.

Motor Design Easily Understood

• • • •

Students "Learn by Doing" with Versatile G-E Motor Construction Kits



Motor after being wound and assembled

General Electric fractional-horsepower motor and generator construction kits provide valuable experience for the student in building standard units of high quality from commercial production-line parts. Each kit of parts is complete except for wire and varnish which are normally available in school laboratories.

The student winds the coils, tests the windings, assembles all the mechanical parts and thus builds a motor that can be used to drive many home or school machines. All mechanical parts are furnished fully machined, thus greatly reducing the time needed to complete the motor, and permitting the student to concentrate on the electrical work and principles involved. Pressing the bearings on the shaft and drilling nameplate holes are the only mechanical operations involved.

Ratings

Construction kits are available in the following ratings:

Cat. No.	Rating	Rpm	Voltage	Frequency Cycles	No. of Phases	Type & Frame	Type of Unit
367X82	¼ hp	1725	115	60	Single	KC47	Capacitor-type
367X83	½ hp	1725	115/230	60	Single	KC65	Capacitor-type
367X84	½ hp	1725	220	60	Three	K63	Squirrel-cage
327X4	300 watts	1725	125	D-c	.....	BC66	Compound-wound

Laboratory Instruction Books

Laboratory-type instruction books are available for the purchasers of these kits. These instructions give a careful step-by-step outline of both the electrical and mechanical assembly work to be done, with well-chosen diagrams and photographs. A good student should be able to follow the instructions and build a successful motor or generator with only nominal supervision from his instructor. A copy of the applicable instruction book is shipped with each kit.

For additional information, check and return post card attached to page F 15

Fractional-horsepower Dynamometer



One of the country's leading technical institutes says: "We feel that the small G-E dynamometer is potentially *one of our outstanding pieces of equipment.* We are able to demonstrate principles that are usually done on machines costing much more. It is small, compact, and versatile.

"By using a variety of motor mounts we are able to test quickly, and accurately, any type fractional-horsepower motor. Since the instruments and load are mounted on the dynamometer frame, the auxiliary equipment is reduced to a minimum. The self-contained dynamometers are ideally suited for small motor repair shops as well as laboratories."

Use the G-E fractional-horsepower dynamometer to:

- Analyze motor and generator characteristics
- Check performance of units built by students
- Study principles and uses of dynamometers
- Determine starting and maximum running torques

A Versatile, Packaged Low-cost Unit

The fractional-horsepower dynamometer is a d-c unit, separately excited, suitable for operation from a 115-volt d-c power source. The shaft of the generator and the frame of the generator are cradled in special sealed ball bearings to form a trunnion mount. This allows a maximum of freedom from friction. The base of the equipment is made of cast iron and has longitudinal slots (parallel to the shaft of the motor) so that varying-size motors or mechanical units may be used. The control panel is mounted at an angle for easy reading. Included as part of the control panel are an armature ammeter, armature voltmeter, "low-off-high" load switch, and a field rheostat. Two screw-base-type resistor units (660 watts each) are located on the rear of the instrument panel for loading the dynamometer as a generator. Larger resistor units can be used. Ordinary light bulbs may be used for resistors if desired.

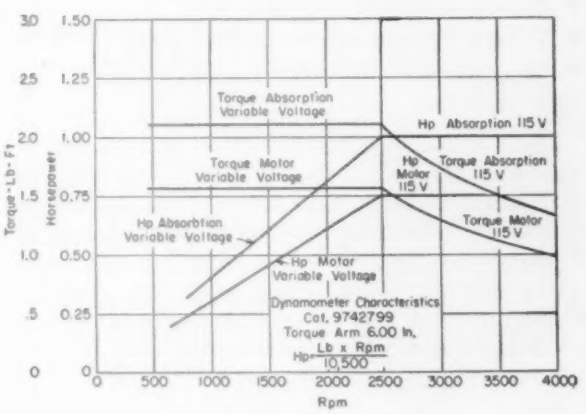
The scale is a 10-inch-diameter Chatillon scale, and is well-damped for easy reading. The scale is marked in pounds with scale subdivisions of 0.1 pound. The weighing arm is 6 inches long so that foot-pounds torque is obtained by dividing the scale reading by two. The scale is preloaded which allows torque reading in either direction of rotation.

Specifications

The speed vs. torque curves covering this equipment are illustrated below.

Power Rating:

Motoring–¾ hp at 2500 rpm.
Generator absorption–1 hp continuous.
Excitation–Separately excited by 115 volts d-c.
Maximum field current–0.25 amp.
Speed–4000 rpm maximum.



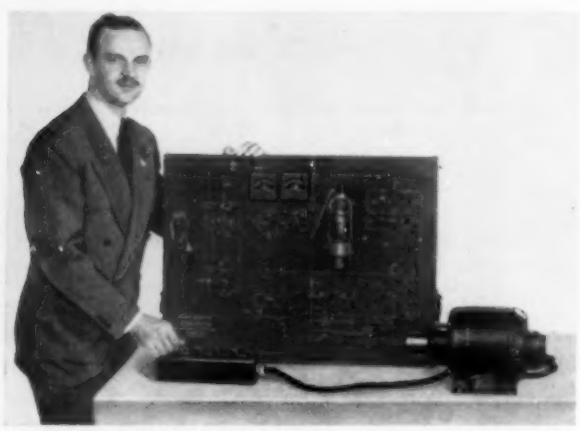
For additional information, check and return post card attached to page F 15

Half-wave Thy-mo-trol* Drive

This G-E half-wave, ½-hp educational Thy-mo-trol drive kit is designed to make students familiar with the fundamentals of half-wave electronic motor control as used in industry. This special educational kit uses the same components and basic circuit principles as the commercial half-wave unit.

The educational Thy-mo-trol drive is a high-grade "breadboard" unit using a dark Textolite* plastic panel furnished in kit form. The school receives all components, including the wire. The work of assembling the unit is done by the school. The circuit diagram is molded in white in the front face of the panel, while actual wiring and all components, except tubes, are to be attached to the back of the panel. All important circuit points are brought out to the front through insulated "banana-plug" jacks. The panel has a base which permits the panel to stand vertically on a bench or table.

The motor and control station are completely assembled and include attached control cables arranged to plug into the panel.



G-E educational Thy-mo-trol drive after assembly of kit

Features

- Easy-to-see wiring diagrams
- Readily accessible components
- Voltage, current, and wave-shape easily checked
- Easy control of auxiliary equipment

Amplistat

The magnetic-amplifier principle is finding broad applications in the electrical field today. Technical institutions will find this G-E educational amplistat a valuable aid in demonstrating this principle to students.

The educational amplistat is also useful for experimental purposes in school and industrial laboratories. It can be used in conjunction with electronic equipment or, in some cases, can replace electronic equipment.

*Reg. trade-mark of General Electric Company.

Features

High power gain—Up to 15,000 watts per watt.

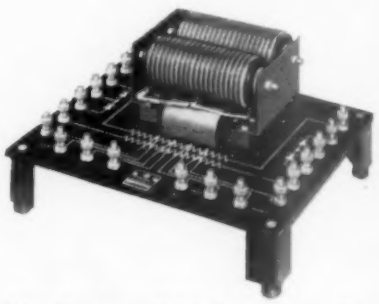
Current output—1 ampere d-c in 50-ohm load.

Convenient—Operates direct from 115-volt, 60-cycle line.

Versatile—Multiple input coils make it a flexible unit, easily adaptable to many types of circuits. Either high or low input impedance is possible.

Compact unit—Excellent for laboratory experiments and "breadboard" setups.

Easy to demonstrate—Schematic diagram is molded into panel surface.



Educational amplistat demonstrates the magnetic-amplifier principle

Amplidyne Control and Servo-mechanism Kit

Contributing greatly to the accuracy, flexibility, and speed of response of control and regulating systems, the amplidyne is an important tool in modern industry. For this reason, the curriculum of practically every technical institution includes instruction on the technical fundamentals of the amplidyne.

The G-E amplidyne control and servo-mechanism kit includes a 1500-watt special educational amplidyne motor-generator set with seven control fields. Leads are brought out to educational spring terminals. Additional co-ordinated accessories, including transformers, selsyns, electronic tubes, and a small gear-motor, are provided to permit the amplidyne and its accessories to be connected and operated as an amplidyne control and servo-mechanism system.



Amplidyne motor-generator set with educational terminal board

For additional information, check and return post card attached to page F 15

New High-accuracy Portable Instruments

High Accuracy. The new G-E Type DP-12 portable instruments feature accuracy of ¼ of 1 per cent of full scale. For less-critical applications, new Type DP-11 instruments have an accuracy of ½ of 1 per cent of full scale. Voltmeters, millivoltmeters, ammeters, milliammeters, and microammeters are available in a wide range of ratings.

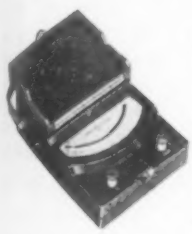
Sturdy Construction. Spring-mounted jewel bearings provide maximum protection against damage from shock. Strong, break-resistant, extra-heavy Textolite* case encloses all instruments.

Better Scale Illumination. New molded window affords best lighting of the instrument's large 5½-inch wide-open scale for fast, correct readings.



Improved Terminals. Terminals are located at the rear of the instrument, away from the operator. This arrangement affords convenient and safer operation. New design accommodates a greater variety of connecting leads.

Medium-size Portable Instruments, Types AP-9 (A-c) and DP-9 (D-c)

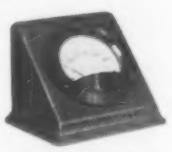


Type AP-9 a-c voltmeter

These sturdy, compact G-E instruments are useful for general laboratory work. Their reliable movements are well-damped, effectively shielded, and housed in dust-tight molded cases. Separate binding posts for each range reduce the danger of overloading. These instruments are available in single, double, or triple ranges of voltmeters, ammeters, volt-ammeters, volt-wattmeters, and single-phase wattmeters.

Small Panel Instruments

These reliable G-E panel instruments are styled for quick and accurate reading. When mounted in 45-degree stands, they are well-suited for school-laboratory test-bench use. Other models are available in rectifier and thermocouple construction and in 1½-, 2½-, and 4½-inch sizes.



Type DO-71 3½-inch instrument in 45-degree stand

*Reg. trade-mark of General Electric Company.

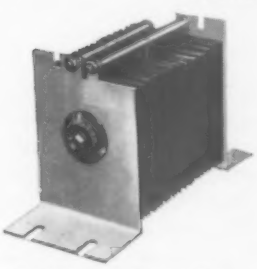
Lecture-room Instruments with 14.2-in. Scales

The shadow-proof dial of these new G-E instruments makes them ideal for lecture-room demonstrations. The convex glass cover affords maximum visibility. The scale surface is flush with the case front. The scale is easier to read and the case is both dustproof and moisture-resistant.

Type AB-16 a-c instruments and DB-16 d-c instruments are 8¾ inches square. Their *14.2-in. scale* makes them exceptionally easy to read. Similar smaller instruments, Types AB-18 and DB-18, are 4¼ inches square and have a 7.1-in. scale. All have 1 per cent accuracy. Available as a-c and d-c voltmeters and ammeters, wattmeters, synchroscope and power-factor meters, a-c temperature meters, and frequency meters.



Metallic Rectifiers



Typical metallic-rectifier stack

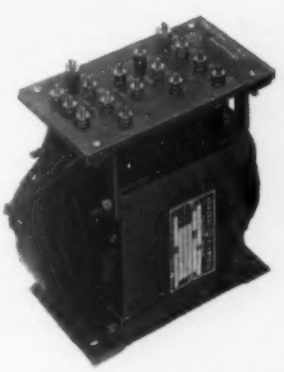
Copper-oxide, germanium, and selenium-rectifier stacks provide an efficient and economical means for converting a-c into d-c for many laboratory purposes. These stacks are available in a wide range of ratings, and rectifiers of virtually any desired voltage and current for normal laboratory use can be assembled from the various-sized cells.

Transformer Construction Kit for Electronics Circuits

This transformer construction kit is designed to give the student a basic understanding of the function as well as the practical application of transformers in electronics circuits.

The unit, Cat. No. 79G867, is rated 0.978 kva, 60 cycles intermittent duty, primary 115/230 volts with secondary voltages 230/172.5/115, 115/center tap, 2.5, 5/center tap.

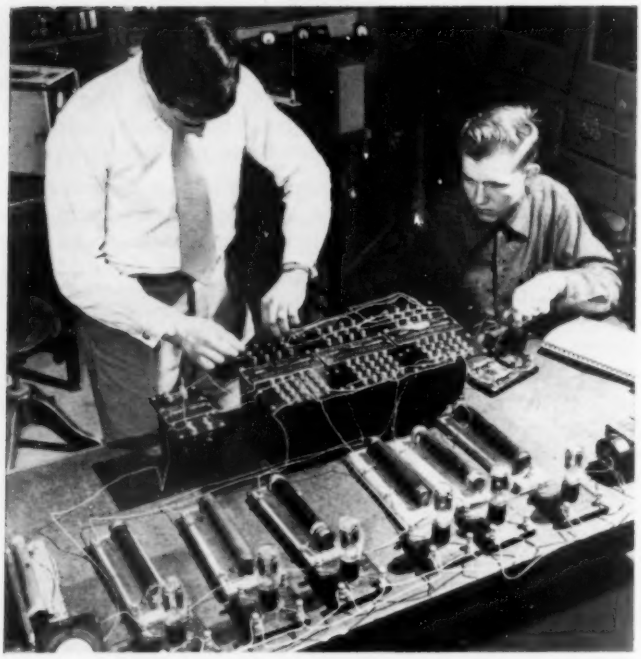
This same transformer is also available as a factory-assembled unit, Cat. No. 79G767.



G-E transformer after assembly

For additional information, check and return post card attached to page F 15

Rectifier Transformer Bank



More than 150 voltage combinations can be obtained with the G-E rectifier transformer

These transformers are especially designed for industrial electronics work in school laboratories. The multiplicity of separate windings and both primary and secondary taps provides for comprehensive laboratory experience with many types of rectifier circuits and many other tests. There are obviously many other laboratory uses for insulated transformers with a wide choice of input and output voltages, as indicated in the connection diagrams shown below.

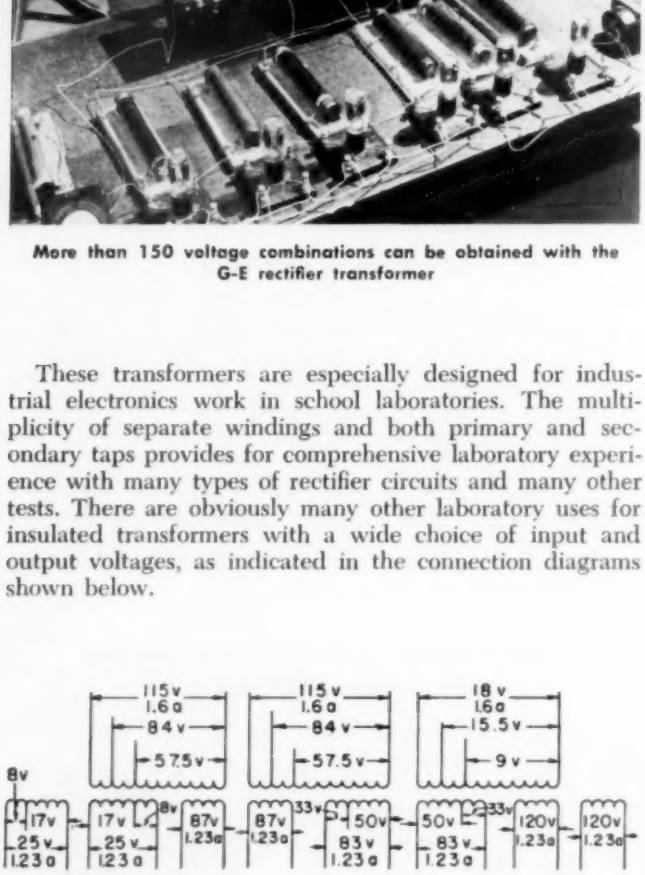


Diagram of connections, rectifier transformer, Cat. No. 78G799

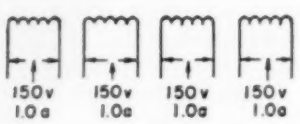


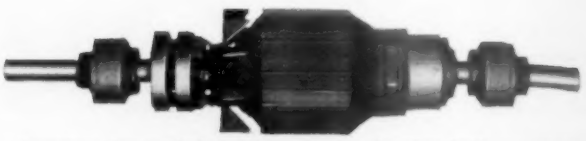
Diagram of connections, interphase transformer, Cat. No. 77G820

Exploring-coil Generator

The exploring-coil generator is 1½-kw, d-c, 125-volt generator to which an exploring coil has been added to permit oscillograph studies to be made of voltages generated in the armature structure.



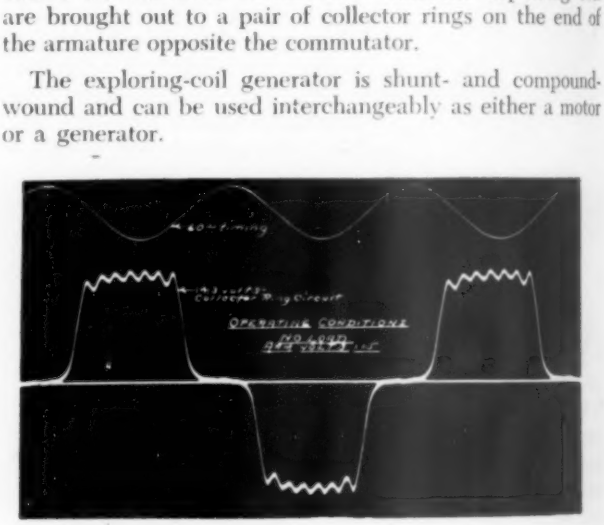
Exploring-coil generator



Armature for exploring-coil generator showing both commutator and exploring-coil collector rings

The exploring coil is isolated from the armature circuit electrically, but is subject to the same flux as the armature winding. Note that only one side of the exploring coil is in a conventional armature slot. The other side lies in a special groove in the armature shaft and this side of the coil is not in the flux path. In effect, the exploring coil gives a true indication of a single conductor cutting the flux of the machine. Connections from the exploring coil are brought out to a pair of collector rings on the end of the armature opposite the commutator.

The exploring-coil generator is shunt- and compound-wound and can be used interchangeably as either a motor or a generator.



Typical oscillogram of exploring-coil voltage. Normal excitation, no-load

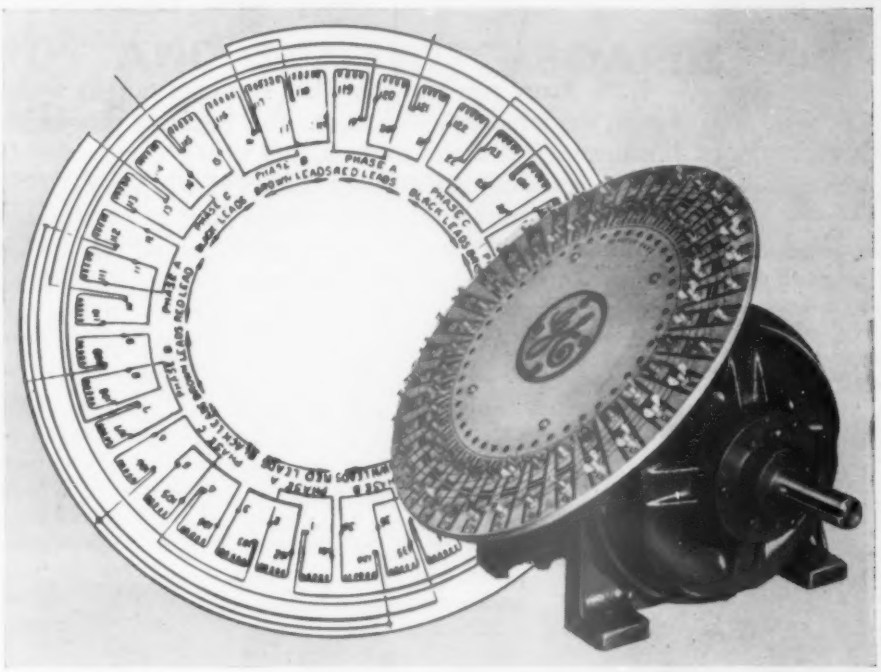
For additional information, check and return post card attached to page F 15

Two-hp 72-terminal Induction Motor

Theory
and
Application
Combined

• • •

The Study of Induction-motor Circuits Is Speeded with This 72-terminal Induction Motor



This 36-coil, 72-terminal induction motor is an excellent unit to assist the student in his study of induction-motor design and the study of circuits in relation to speed, phase, and power. This motor enables the student to combine his theoretical work with actual practice in selecting circuits for the different available combinations of phase and speed and then testing these motors for comparative torque, horsepower output, efficiency, power factor, and other tests.

The construction of the motor enables the student to do this work with the minimum of time. The 36 coils are in place, with their 72 leads permanently connected to wing-nut terminals on the specially designed circular connection board assembled to the motor frame as illustrated.

To further illustrate the fundamentals of the squirrel-cage motor, the number and relative position of rotor bars with respect to stator coils is indicated on the connection board. A set of color-coded leads is included to assist the student in tracing his connections.

Many ratings are possible with the G-E 72-terminal induction motor. It is actually ten or more motors in one at the student's disposal, since the unit can be wired for ten different combinations of phase, voltage, and number of poles.



On request, we will gladly send you a copy of this 16-page bulletin, GEA-5526, containing information on other specially designed G-E Educational Equipment for electrical laboratories. Merely check the attached return post card. General Electric Company, Apparatus Sales Division, Schenectady 5, N. Y.

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This course is excellent for fundamental instruction or review for advanced physics, electrical, and other technical students anxious to take their places in the growing world of Industrial Electronics. Every sequence of the twelve-part course has been tested on groups of widely different educational levels. Educators and plant executives alike have praised its combination of easy understanding and technical accuracy.

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6. Electronic Relay Systems
7. Electronic Rectifier Equipment
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1 Instructor's Manual—a 146-page book with hundreds of illustrations and detailed instructions for organizing the meetings and handling group discussions.

1 Carrying Case—attractive and strongly built, it holds records, films, and manuals.

The price of the complete package is $150. Extra manuals, $3 each; extra sets of the 12 review booklets, $3 each.

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This ten-lesson course shows simply but clearly how motors operate, what types are in use today, and how to select and apply the right motor and control for different jobs.



These important subjects are covered by the course:

1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Motor Selection
4. Selection & Application of A-c Polyphase Induction Motors
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The complete kit includes:

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Review Booklets—10 copies of the ten-booklet set.

1 Carrying Case

Prices—For the complete kit, $100. Extra instructor's manuals, $1.50 each; extra sets of the ten review booklets, $1.50 each.

Orders for these courses can be placed through any local G-E office, or write to General Electric Company, Section 640-382, Schenectady 5, New York. For additional information on the Electronics Course and the Motor Selection and Application Course, check and return post card attached to page F15.

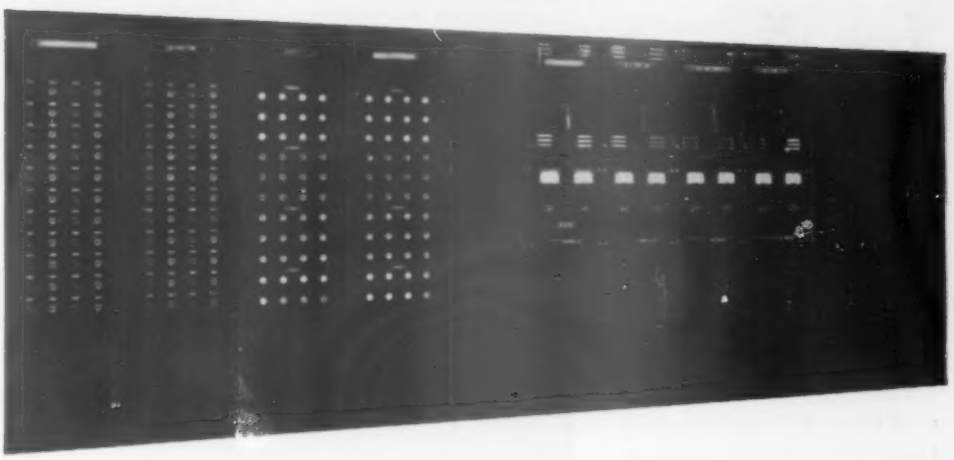
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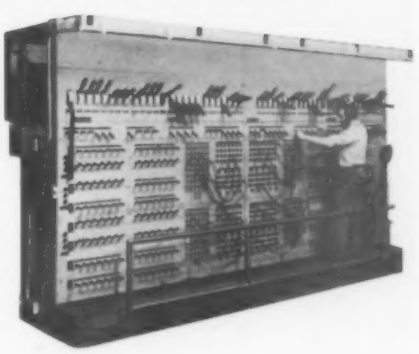


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Flush type service outlets in all types of combinations have recess box of code gauge steel for mounting in tables, desks or walls.

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For full information about Federal Noark Motor Starters, Contactors, Push-button Stations, Safety Switches, Panelboards, Circuit Breakers, Power and Light Distribution Switchboards, Auditorium and Stage Lighting Switchboards, etc., write Federal Electric Products Company, 50 Paris St., Newark 5, N. J.

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Laboratory table tops, shelving, splash backs, sinks, drainboards, gutters, pegboards, aquaria, tanks, moisture-proof cabinets, developing sinks and tanks, etc., etc.

This stone has an abrasive resistance factor (U.S. Bur. of Standards) of 6, and a maximum absorption of 0.2%. It is homogeneous, very dense and tough and finely granular in all directions; highly resistant to acid and alkali attack, entirely free of laminations (cleavage planes). It is possible to machine it without splitting, chipping or spalling. It is easily kept clean. Discolorations can be removed readily with a good scouring powder. Being uniform throughout, with no surface glaze, the surface can be readily touched up with sandpaper or by honing.

This stone is sometimes used where a low-temperature basic refractory is required, such as for the lining of lead oxide smelting furnaces.

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Slip-tongue Joint—for table tops



Tongue-and-Groove Joint—for fume hoods, tanks, sinks

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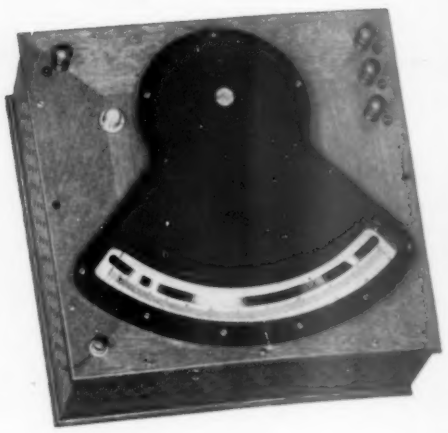
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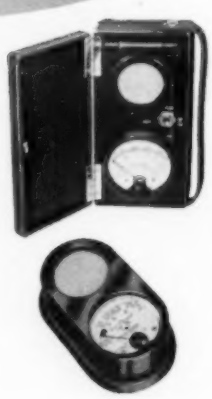
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and Laboratory Requirements

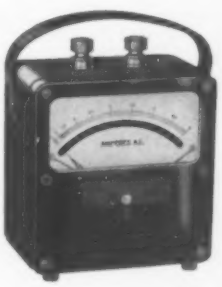
WESTON ELECTRICAL INSTRUMENTS

WESTON Portable Standards (¼ of 1% class)

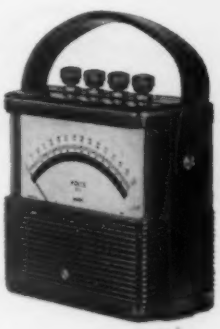
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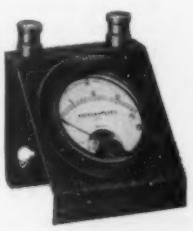
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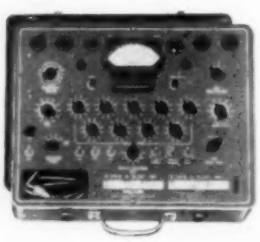


—a high gain, wide band oscilloscope. Band width of 4 megacycles allows accurate display of video frequencies, including pulse wave forms and color synchronizing bursts. High sensitivity of 17 millivolts per inch makes it ideal for setting resonant traps, as a general null indicator, and for signal tracing in low level stages, as well as for sweep frequency visual alignment of TV receivers. Has provisions for internal calibration, internal phased sine wave, and Z-axis intensity modulation. Reversal of polarity of both horizontal and vertical signals accomplished by means of toggle switching.



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—a self-contained, battery operated Vacuum Tube Voltmeter, particularly useful in Radio and TV servicing and electronic courses involving peak to peak measurement of a-c voltages. Makes possible quantitative measurement of all complex wave form voltages utilized in video, sync and deflection circuits with no a-c line interference in critical measurements. Battery operation affords complete isolation from spurious response due to stray a-c fields and circulating ground currents.



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—highly versatile, accurate and rugged volt-ohm-milliammeter with a combination of functional ranges which provide a wide range of test measurement applications in the electronic field. Has a d-c sensitivity of 20,000 ohms/volt, and an a-c sensitivity of 1000 ohms/volt. Accuracy is 2% d-c, 3% a-c. Range and functional switching is greatly simplified by use of a single dial for all ranges and functions.

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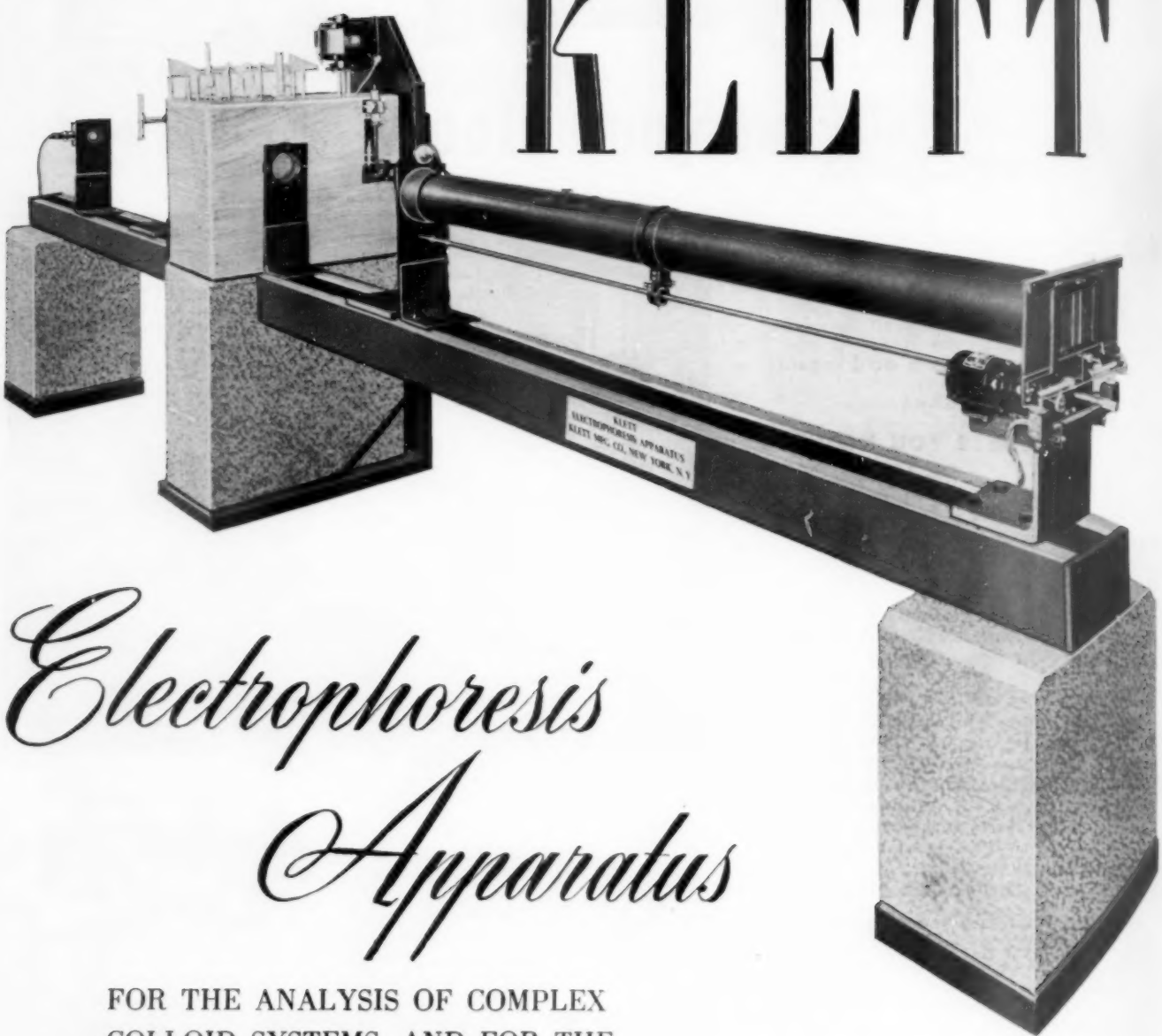
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Complete apparatus for various types of electrophoretic analyses. Concentrations of individual components of multicomponent systems can be measured by means of several different systems of recording.

The accessories include conductivity bridge, and cells for measuring diffusion coefficients, for index of refraction, and for separation of large amounts of substances.

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PHOTOELECTRIC COLORIMETERS



CLINICAL COLORIMETER

The Klett-Summerson photoelectric colorimeters are easily operated filter photometers. The scale readings of the potentiometer are proportional to the concentration of the colored substance in the cuvette when Beer's Law holds. The balanced two-photocell construction permits operation on unstabilized A.C.-D.C. circuits.

The Industrial model can use either the cylindrical cuvette or a 2 to 4 cm deep rectangular cuvette for measurement of solutions with very pale colors.

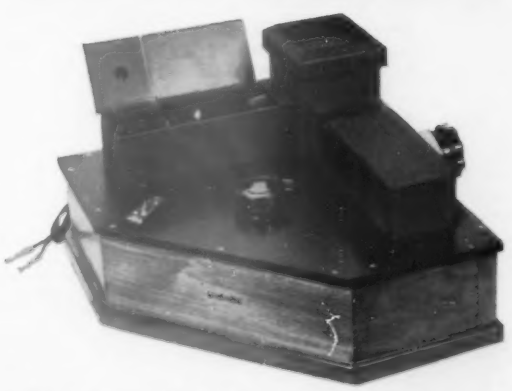
The Clinical model requires a sample of 1 to 5 ml for its cylindrical cuvette.

THE KLETT BIO-COLORIMETERS

A cup and plunger colorimeter for direct visual comparison of unknown with a standard solution. The glass scale and vernier are read from the top. No filters are used.



The Klett Fluorimeter



Designed specifically for measuring very small amounts of fluorescing substances such as: vitamins, blood pigments, chlorophylls, carcinogenic hydrocarbons, many other substances.

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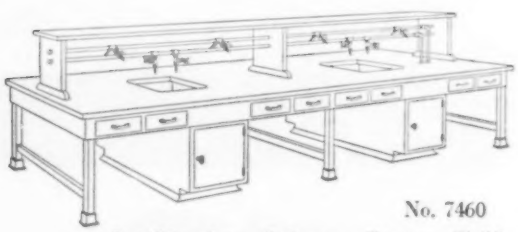


No. SH38C (Sash)



No. OH38 (Open)

Chemical Fume Hoods. Open hoods, 3" to 12' long. Integral single-sash hoods, 3', 4' and 5'. Integral double sash hoods, 6', 7', 8' and 10'. Cabinet or leg support. Blower supplied when specified.



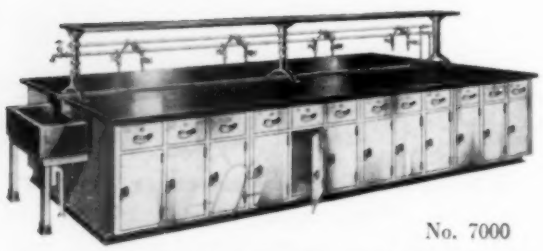
No. 7460

Combination Science Center Table. Has 16 drawers, 4 cupboards, for 8 students. Length overall, 12' 6". Standard center tables are 54" wide and 37" high.



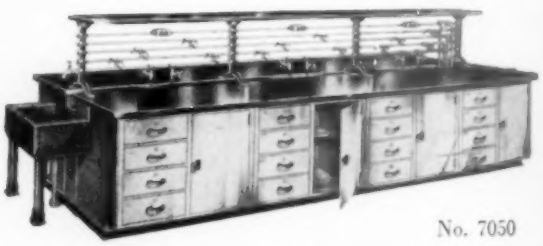
No. 7110

General or Qualitative Chemistry Wall Table. 4 students, 4 changes. 11' 11" long, except sink. Gas, water and cupboard for each student. Standard wall tables are 30" wide, 37" high. Length and services optional.



No. 7000

General or Qualitative Chemistry Center Table. 8 students, 3 changes, but accommodation can be more or less. 11' 11" long overall, plus sink. Choice of services.



No. 7050

General or Qualitative Chemistry Center Table. 8 students, 4 changes. Cupboards have removable shelf and thistle tube rack. Full length lead trough. 11' 11" long, except sink. Length and fittings optional.

STEELAB Standardized Unit Construction Permits Practically

Make a permanent, fireproof capital investment in STEELAB furniture!

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No. 5820



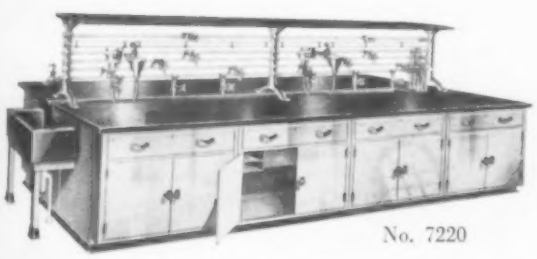
No. 5800

Storage Cabinets, with glazed or solid doors, hinged or rolling on ball-bearings. Adjustable shelves for chemicals, glassware, apparatus, instruments, etc. Integral units, 3′ or 4′, in any combination desired. Standard 16″ deep. For books, 12″ deep.



No. 7260

Organic Chemistry Wall Table, for 3 students, 2 changes. 12′ long, overall, except sink. Each student has drawer and cupboard, water, gas, air, vacuum, electricity.



No. 7220

Organic Chemistry Center Table. 4 students, 2 changes. Conical steam bath, air, vacuum, gas, electricity, water, cupboard and drawer for each student. 11′ 11″ long, except sink.

ONLY IN STEELAB do you get the patented *Labflex Design* (pat. pending) permitting interchange of drawers and cupboards.

ONLY IN STEELAB do you get exclusive *Lock-Joint Construction* Joints are notched, keyed, and fitted together to make a rigid, mechanically, interlocking joint before welding.

ONLY IN STEELAB do you get exclusive *Moulded Bakelite Hardware,* with machined solid bronze core, as standard equipment. Non-corrosive and permanent!



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Micro-leveling adjustor is standard on all STEELAB equipment.

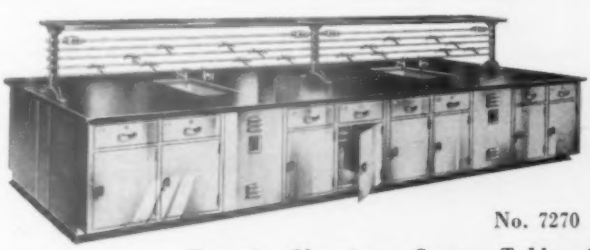
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Consult our Engineering staff without obligation



No. 8260

Instructor's Desk. Choice of drawers, cupboards, service fixtures, etc. 14′ long, or longer or shorter. Safety glass explosion shield and heat pad, optional.



No. 7270

Organic Chemistry Center Table. 8 students, 2 changes. Each student has cupboard, drawer, electricity, water, gas, air. Length overall except sink, 15′. Waste chute in sink front.

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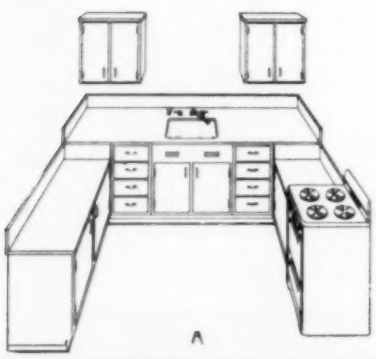
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Although this equipment is designed for school use, **METALAB** material is prepared for the rigid requirements of industry. This leads to a twofold advantage in your school: **(1)** Your students become well accustomed to using professional equipment. **(2)** Your institution enjoys the advantage of having equipment proven in the severe testing ground of industry.

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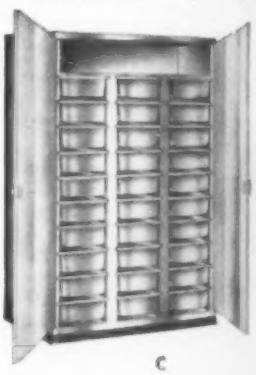


A

A representative group of equipment selected from our Educational Catalog EC-2 are shown at the bottom of these 2 pages, with appropriate alphabetical designations for identification purposes:

A. Unit Kitchen—Catalog No. *6405* B. Modulab Center Table—Catalog No. *MOD-103* C. Tote Tray Cabinet—Catalog No. *6550* D. Multi-Purpose Table *7000* Series

E. Sectional Unit—*Type G* F. Sectional Unit—*Type H* G. Instructor's Desk—Catalog No. *5800* H. Engineering Service I. Combination Science Student Table—Catalog No. *5130*



C



B

D

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Students being trained for positions in the world of Science and Industry should have experience in working with *METALAB* accepted type of professional equipment. The *transition* from the school laboratory to the professional laboratory can be accomplished with ease and confidence.

We know your needs are of *vital* importance to you. This automatically makes them of *prime* importance to us, and subject to our highest standards of quality and service.



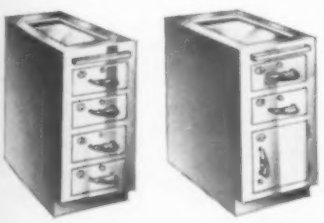
Typical Secondary School Chemistry Laboratory

School Laboratory Equipment is specifically engineered to withstand continuous hard usage and wear in busy laboratories. Constructed of chemically-resistant, enamelled, lead-coated steel and stone, Metalab units are **rugged, fireproof, waterproof,** and **corrosion-resistant.** They will endure a lifetime of active use because of the strength-giving construction features listed in the adjacent right hand column.

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- **Die-formed inner and outer panels have superior mechanical strength.**
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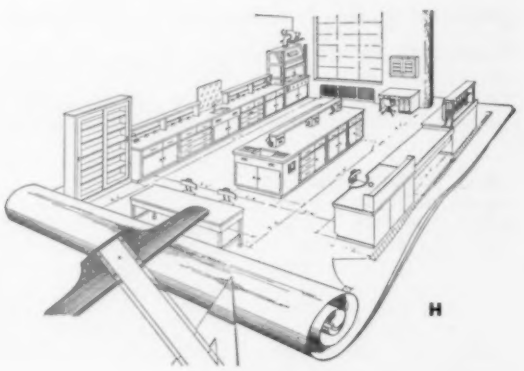
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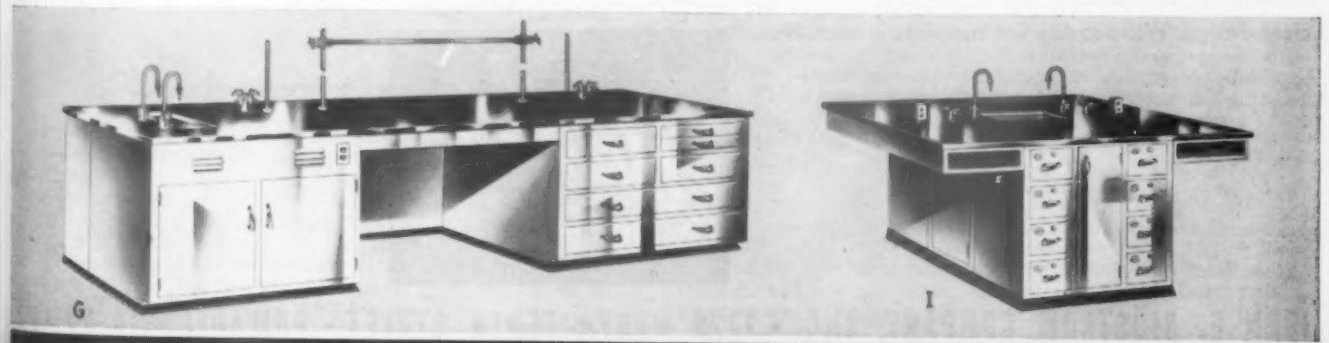


E F

- **CASES AND CABINETS**
  Chemical, Apparatus, Instruments, Glassware, Microscope, Museum, Specimen, Acid Storage, Map and Chart, etc.
- **CHEMICAL FUME HOODS**
  (Open and Closed Types)—Complete with exhaust fans and ducts. Acid-Proof Sinks, Tanks, Special Laboratory Fittings and Accessories.



H



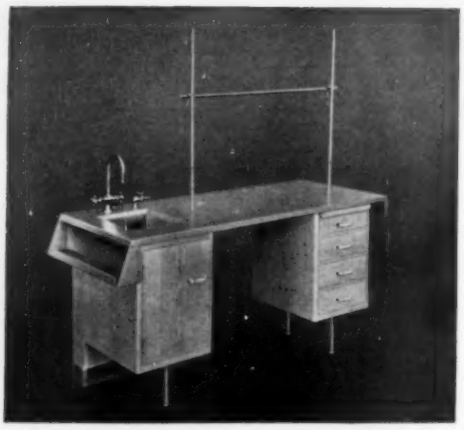
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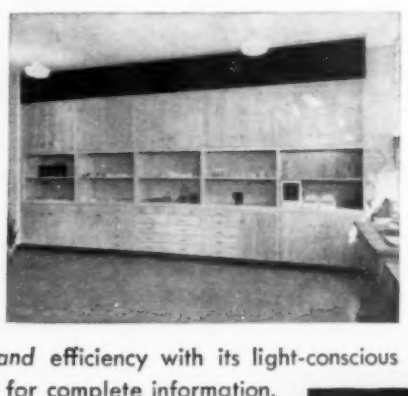
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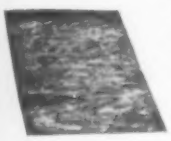


Used by leading laboratories the world over. Tygon flexible-plastic Tubing is clear for ready solution visibility; flexible for simple and easy connections; tough and non-oxidizing for long, economical life. Will handle practically all chemical solutions found in college chemical labs. Available in a wide range of sizes at all leading laboratory supply houses.

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Tygothene, a modified polyethylene, is a "special application" laboratory tubing developed to meet the need for a semi-flexible tubing combining *solvent* resistance with maximum resistance to both acids and alkalies. Tygothene is completely non-toxic, tasteless and odorless. Tygothene is made in two degrees of flexibility. Formulation A, is of medium flexibility while formulation B possesses the maximum flexibility possible with polyethylene compounds. The natural color of the tubing is a translucent white.

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Just the thing for laboratory furniture, table tops, fume hoods, etc. Applied with brush or spray gun to metal or concrete. Resists acids, alkalies, oils, water, alcohol. Tough, flexible film, resists abrasion, will not chip or flake off. Wide range of colors, including white, black, light and dark gray, green, red, blue, yellow, aluminum and clear.



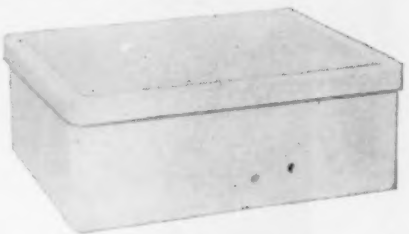
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Our Acid-Proof Chemical Stoneware Pipe and Fittings are made of de-aired (vacuumized) clays. All pipe lengths are straight, even and round, thus facilitating erection. In the bell-and-spigot type, the hubs are all 4" deep and both the spigot and hub ends are deeply corrugated. Every piece is accurately molded and as true to dimensions as can be made by master-craftsmen highly skilled in the ceramic art. The joints may be sealed with our "CALK-TITE" Acid-Proof Caulking Compound.

Would you like us to send you a copy of Bulletin No. 550A on Acid-Proof Piping? It's filled with a wealth of engineering and technical data, authoritative information on the most modern pipe caulking methods, installation techniques, etc. Free on request.

GRAY GLAZED CHEMICAL PROOF LABORATORY SINKS

United States Stoneware Company Chemical Laboratory Sinks are manufactured from a completely vitrified white ceramic body. They are molded in one piece without joints.



Body and glaze will resist indefinitely the action of any acid or any other chemical, with the exception of hydrofluoric acid and of concentrated hot solutions of the alkali hydroxides. This material can be, however, exposed to the action of cold concentrated hydroxide solutions for long periods of time and to that of hot concentrated solutions of alkali hydroxides intermittently for not too excessive length of time.

The smooth, attractive gray glaze lends itself to thorough and easy cleaning with acids, detergents or solvents. This surface is equal in smoothness to that of porcelainized steel and superior to that of chemical stoneware, soapstone, etc.

"U. S." Chemical Proof Laboratory Sinks will withstand the maximum thermal shock encountered in service, that is alternate filling with boiling water and ice water. The sinks have a modulus of rupture of more than 10,000 pounds per square inch and will, therefore, withstand even such loads, which are not encountered in normal service.

The sinks are made with a wall-thickness varying from 7/8 inch for the smallest sinks to 1-1/4 inches for large sinks. A reinforcing rim is provided at the top of the sink. If necessary, a caulking groove can be cut into this top to facilitate easy undertable mounting. All inside corners of the sinks are rounded to a minimum radius of 3/8 inch and all sink bottoms are sloped 1/4 inch per foot or more to the drain opening. A reinforcing pad is provided at the outside bottom of all sinks around the drain opening, to provide sufficient strength for installation of tray plugs.

Smooth, attractive finish, rounded corners and edges, sloping bottom, reinforced rim and outlet, one piece construction, unsurpassed resistance to corrosion and extremely high mechanical strength are the main advantages which distinguish this sink from sinks manufactured from other materials.

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U. S. Stoneware ceramic vacuum filters are made in a wide range of types and in capacities ranging up to 100 gallons. Both white chemical porcelain and Brown chemical stoneware bodies are available. All units will withstand a complete vacuum. Write for Bulletin F-37.

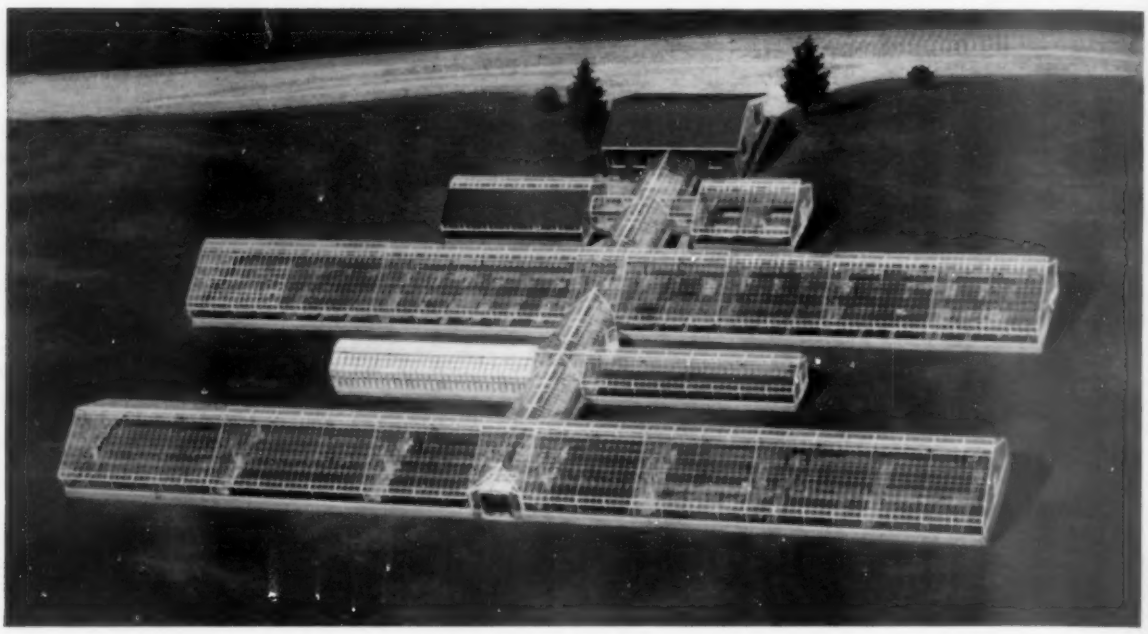
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Continuous Screw
Woodworkers' Vise



No. 5CD-S
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Adjustable
Steel Handle

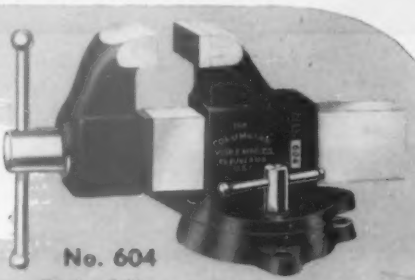


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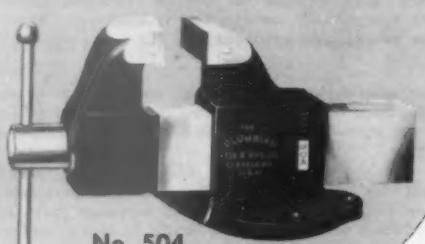
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Sturdily constructed of highest quality materials for long, hard service. Phosphor bronze drive nuts. Quick-action shift button. Choice of enclosed model with green plastic handle or open-spiral model with hardwood handle. Three sizes—small, medium, large.



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. . . with high-quality Greenlee hand tools for craftsmen

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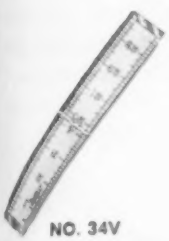
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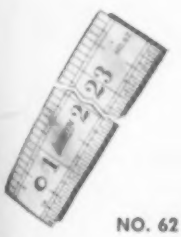
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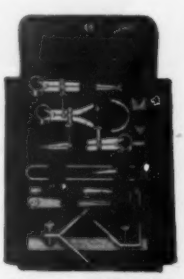
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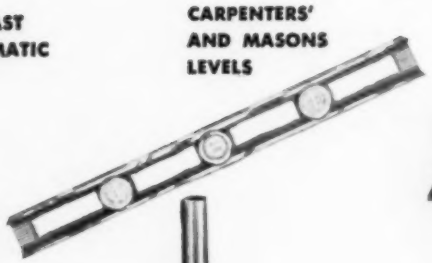


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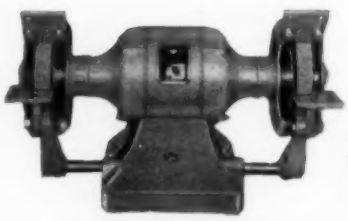




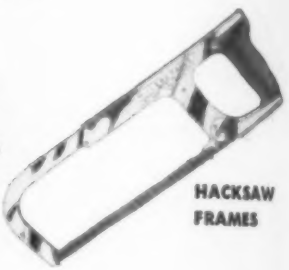
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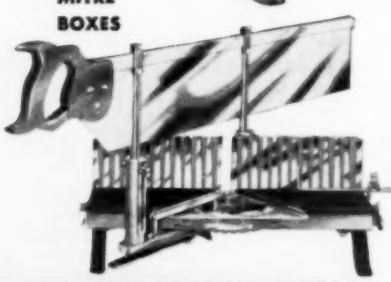
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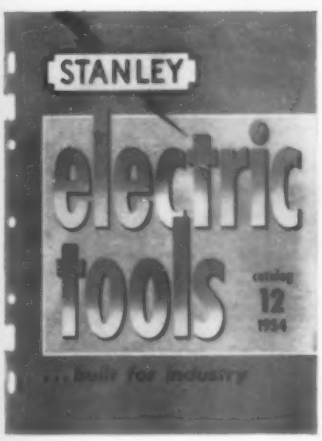
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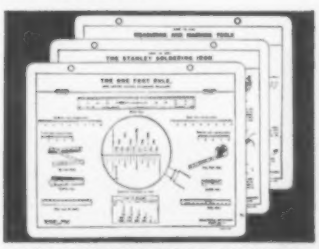
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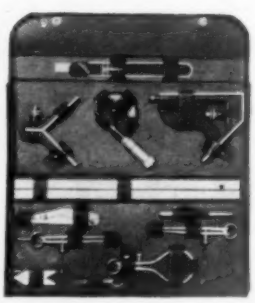
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1 **MODEL TM-12** (Illustration 1) The popular Four Student Bench with metal locker base. Electronically glued northern, hard maple Tolco top using ¾" laminations. Top 54" x 64" x 2¼". Base sections constructed of extra heavy gauge metal. Twelve lockers in base. Colors modern gray or olive green.

2 **MODEL TV-14** (Illustration 2) Two Student Machinist Bench. Rugged Tolco interlocking construction. Flat Surfaced Tolco top electronically glued using only northern, hard maple ¾" laminations. Each side has one large drawer and six project storage drawers. Top size 2¼" x 52" x 36". Height 32".

3 **MODEL T-14** (Illustration 3) Two Student Cabinet Type Bench. Tolco electronically glued top using northern, hard maple ¾" laminations. Center tool well. One large drawer and six project storage drawers on each side. Top size 2¼" x 52" x 36". Height 32".

4 **MODEL TK-2** (Illustration 4) Two Student Kindergarten Table. Tolco top constructed of edge grained northern, hard maple 1⅛" x 42" x 28". One storage drawer on each side. Optional heights to 30". MODEL TK-1 One Student unit—same construction—top size 22" x 42"—one drawer only.

5 **MODEL TSB-60-1** (Illustration 5) Sheet Metal or Machine Bench. Heavily constructed of northern, hard maple. Tolco electronically glued laminated top 2¼" x 60" x 40". Laminations ¾" wide. Edges protected with angle iron. One storage shelf.

6 Wall Assembly Metal Locker Base Units (Illustration 6). For efficient use of wall space. Uses same metal base units as MODEL TM-12. Standard Tolco laminated top. Base sections are 36" long and in multiples can fill any wall area. Tolco tops custom made to fit.



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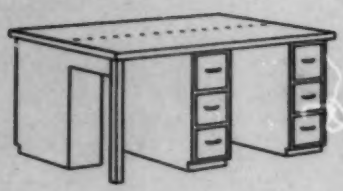
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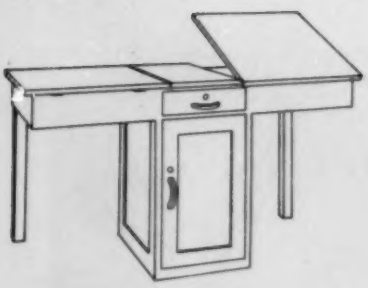
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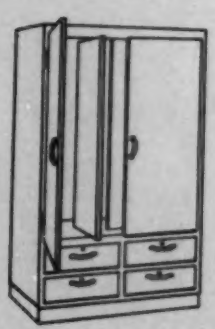
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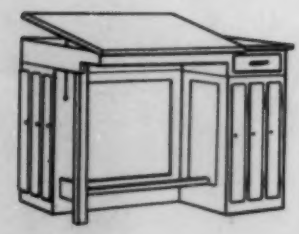
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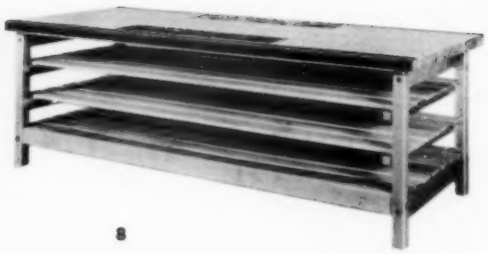
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8



TOLCO EDGE GRAINED TOPS

Right Illustration—Section of standard Tolco top showing edge grained ¾″ northern, hard maple laminations. Narrow ¾″ laminations electronically glued in high frequency radio presses have a 100% glue bond over the entire glue area. They are reinforced with ⅜″ steel through bolts. Finished with one coat of lacquer sealer and two coats of clear lacquer.

7 **MODEL T-10** (Illustration 7) Two Student Bench. Northern, hard maple construction. Standard 2¼″ x 52″ x 36″ Tolco top with center tool well. One large drawer and four project storage drawers on each side. MODEL TV-10 Machinist Bench—same size and construction with flat top and no center tool well.

8 **MODEL TSB-96-3** (Illustration 8) Sheet Metal Bench. Very heavily constructed of northern, hard maple. Edges protected with angle iron. Two stake plates 37½″ x 8″ set flush in 2¼″ x 96″ x 40″ Tolco laminated top. MODEL TSB-60-3—same construction, but only 60″ long. Stake plates 30″ x 8″.

9 **MODEL T-2** (Illustration 9) Two Student Bench—open frame construction. Standard Tolco top 2¼″ x 52″ x 36″ with center tool well. One large storage drawer each side.

MODEL T-02—Same size and construction without drawers.
MODEL TV-2—Machinist Bench—same construction and size—flat surfaced top, one large drawer each side.

10 **MODEL TE-72** (Illustration 10)—Electrical Bench. Tolco 2¼″ thick laminated top with wired strip in center. Six tool storage drawers on each side. Heavily constructed—72″ long 48″ wide.

11 **MODEL TA-2** (Illustration 11) Two Student Art Table. Two tilt tops with stationary center section. Large center storage cabinet and one drawer. Tops flat grained hard maple, basswood or composition. Overall size 60″ long 24″ wide 30″ high.

12 **MODEL TS-48** (Illustration 12) Tool Storage Cabinet. Spacious hardwood cabinet for tool storage. Heavily constructed making it possible to store tools on sides and back of the cabinet. Two rotating tool panels mounted on separate fasteners. Four large drawers. Locks furnished. Size 48″ wide 22″ deep 84″ high.

13 **MODEL TD-6** (Illustration 13) Drafting or Art Table. Northern, hard maple construction with large tilting top and smaller stationary section. Six storage compartments for boards and instruments. Instrument trays 2″ x 2″ x 14″ furnished. Laminated maple, basswood or composition tops furnished. Overall dimensions 38″ wide 28″ deep 36″ high.

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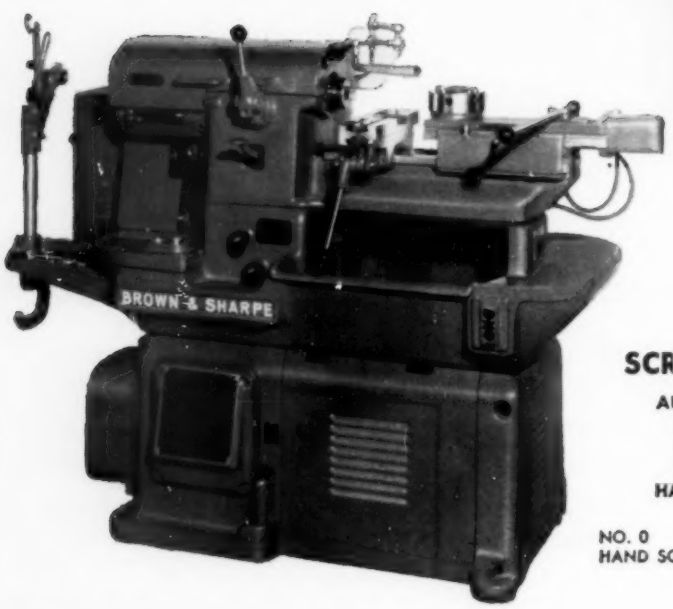
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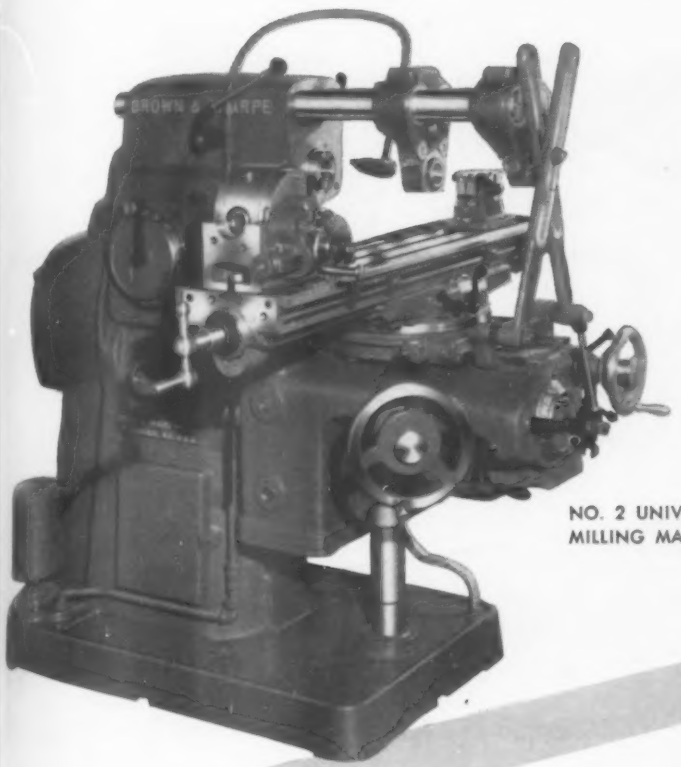
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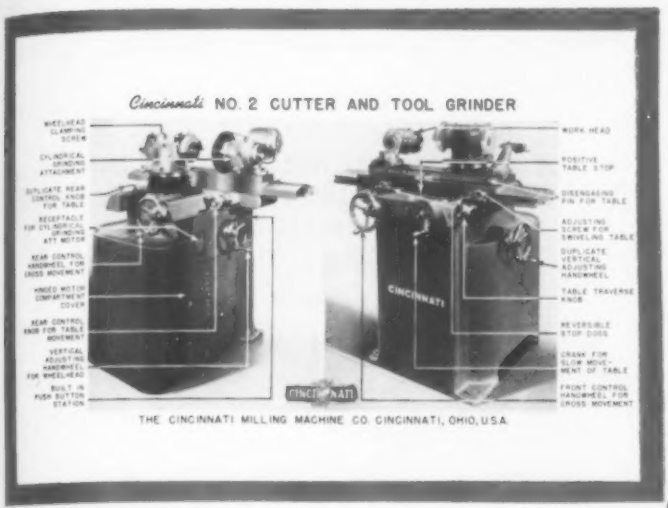
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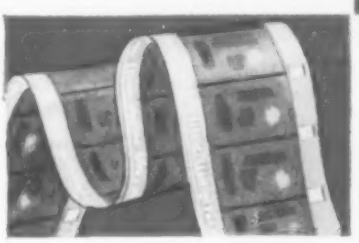
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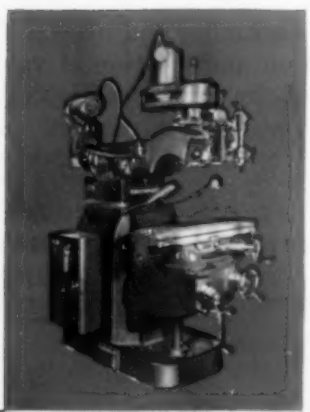
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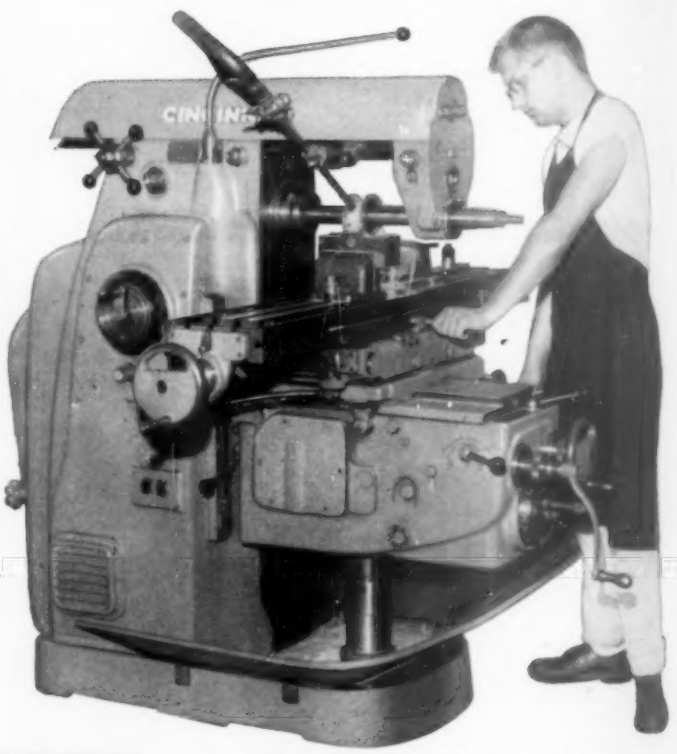


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CINCINNATI

See the reverse side of this page for Cincinnati training aids available to school shop instructors.

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

THE BLACK & DECKER MFG. CO.

693 Pennsylvania Avenue, Towson 4, Maryland

BRANCHES IN:
Atlanta, Baltimore, Birmingham, Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Denver, Des Moines, Detroit, Houston, Indianapolis, Kansas City

Black & Decker
PORTABLE ELECTRIC TOOLS

BRANCHES IN:
Louisville, Los Angeles, Memphis, Miami, Milwaukee, Minneapolis, New Orleans, New York, Newark, Oklahoma City, Omaha, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Seattle, St. Louis, Syracuse

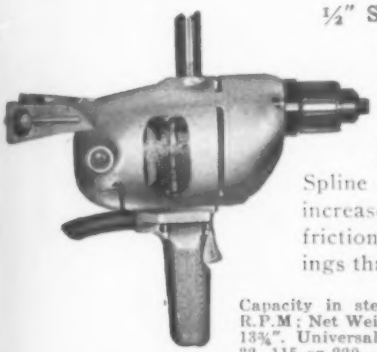
BLACK & DECKER Portable Electric Tools are used throughout industry for production and maintenance work. Also they are famous in the automotive service industry. Here are just a few of the popular tools.



¼" HEAVY-DUTY HOLGUN DRILL

A perfectly proportioned "Handful of Power". Completely ball-bearing equipped and built for all types of drill service. Operating balance is second to none.

	Standard Speed Model	Low Speed Model
Capacity in steel	up to ¼"	up to ¼"
No-load Speed	1700 RPM	600 RPM
Net Weight	3¼ lbs.	3½ lbs.
Overall Length	7¼"	7⅝"
Spindle Offset	¾"	¾"
Cat. No.	457	460
Price, complete, specify voltage	$44.00	$52.50

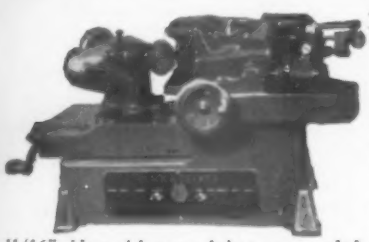


½" STANDARD DRILL

The most popular general-purpose Electric Drill. Ideal for driving twist drills, Hole Saws and wood augers. Spline mounted spindle gear increases strength, minimizes friction and wear. Ball-bearings throughout.

Capacity in steel ½"; No-load Speed 400 R.P.M.; Net Weight 9¾ lbs.; Overall Length 13¾". Universal Motor; Standard Voltages 32, 115 or 220.

Price, complete, specify voltage—(Cat. No. 361) $60.00



Deluxe Super-Service Valve Refacer

"Latest word" in valve refacing equipment. Traverse grinds all angle valves including flat-type. Handles all valve heads up to 4" in diameter and valve stems from 9/32" to 11/16". Hypoid gear drive on work head eliminates vibration and chatter. Completely equipped for wet grinding. Large amount of standard equipment including attachments for grinding Valve Stems, Tappets and Rocker Arms.

Net weight 109 lbs.; Standard voltages 115 or 220.

Price, complete, specify voltage—(Cat. No. 550) $385.00

Just a few of the other items in the complete line are Screwdrivers, Tappers, Hammers, Saws, Grinders, Shears, Sanders, Valve Seat Grinders, Hole Saws, Wire Wheel Brushes, Polishers, etc.

BLACK & DECKER UTILITY Electric Tools are popular-priced portable tools for home, farm and workshop. Ideal for intermittent work. Many useful accessories are available for these handy tools.



¼" UTILITY DRILL

Saves hours in numerous building and repair jobs. Drives twist drills, wood augers, masonry bits, wire brushes, grinding wheels, buffing wheels, sanding discs, polishing pads, abrasive bands, etc.

Capacity: in steel.....¼" Net Weight.....3¼ lbs.
Capacity: in wood.....½" Overall Length.....7⅝"
No-Load Speed.2250 R.P.M. Standard Voltage..115 volts
Universal Motor for A.C. or D.C. current

Price, complete—(Cat. No. U-1) $22.95

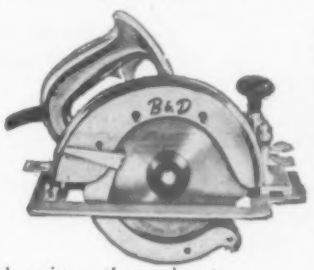
Other BLACK & DECKER UTILITY Tools include: ½" Drill; ¼" All-Purpose Drills; Orbital Sanders; Drill Stands; Drill Kits; Supplies and Accessories. Also a versatile Portable Jig Saw that cuts practically any material.



Orbital Sander

Sand ten times faster than hand sanding with the popular 44 Sander. It won't track, score or burn the surface. Use it to finish wood or metal surfaces, sand between finishing coats of shellac, varnish, etc. Prepare flat surfaces for painting or repairing.
King-Size platen permits sanding into corners. Change paper in a jiffy with Sander's positive locking device. Instant-release trigger switch can be locked "ON". Powerful 115 volt A.C. or D.C. Universal Motor.

Price, complete—(Cat. No. U-44) $46.95



7" Heavy-Duty Saw

Has both front and rear cutting depth for maintaining comfortable sawing position at any depth of cut; auxiliary knob for two-handed guiding when desired; large, sturdy shoe; accurate bevel cuts from 90° to 45°; instant-release switch and every modern construction and safety feature, with lubricant sealed ball bearings throughout.

Diam. of Saw Blade 7⅜"; Depth of Cut 2⅞"; No-load Speed 4200 R.P.M. Net weight 11½ lbs.; Combination Blade furnished with Saw. Carbide-Tipped, Crosscut, Planer, Nail Cutting Blades or Abrasive Disc available as accessories.

Price, complete—(Cat. No. U-70) $84.50

Complete Utility Saw Line includes above Saw and: 6" Heavy-Duty Adjustable Saw (Cat. No. U-62), 7" Heavy-Duty Saw (Cat. No. U-70), 8" Heavy-Duty Saw (Cat. No. U-80) and 9" Heavy-Duty Saw (Cat. No. U-90).

Price, complete—(Cat. No. U-62) $64.50
Price, complete—(Cat. No. U-80) 96.50
Price, complete—(Cat. No. U-90) 114.50

COMPLETE CATALOGS SENT ON REQUEST—ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

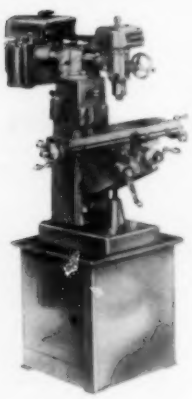
Atlas PRECISION TOOLS

There are many ways Atlas tools can be helpful when you plan for equipment expansion or replacement. If shop space is limited, compact Atlas tools give you more pupil stations in the available space. Atlas quality construction will win commendation from those who expect you to buy tools for many years of good service.

Best of all, Atlas low prices enable you to buy more tools for your equipment dollars so that more students have opportunity to get sound operational experience. When you plan for next term, make sure you have the latest Atlas catalogs as a guide in determining your recommendations and requisitions.

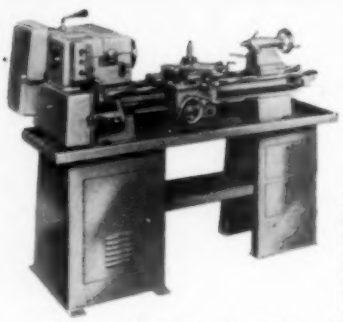
Teach Metalworking at Low Cost

NEW CLAUSING VERTICAL MILLER



Mills, drills, bores, reams and shapes—at all angles—with one work setup! 6" x 24" table, high precision spindle head. 3" quill travel, six speeds —180 to 3250 R.P.M.

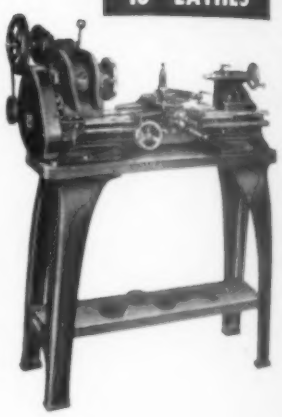
NEW CLAUSING "5300" LATHES



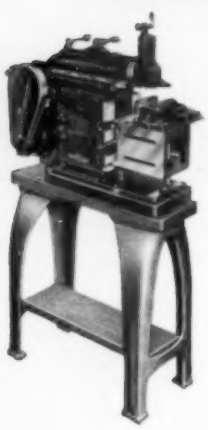
The only low-cost lathes with Timken tapered roller bearings. 16 spindle speeds; power cross and longitudinal feeds standard equipment. Greatest value by far for school shops.

New Clausing "5300" series 12" lathes offer more Plus Values for school shop work than ever before in a 1" collet capacity lathe . . . at or near its price. "Zero-Precision" Timken tapered roller bearings. Exclusive friction clutch and brake countershaft. No. 3MT tailstock with tang socket. Quick change mechanism. 12" swing over bed. 24"—36"—48" between centers.

10" LATHES



7" SHAPERS



The only compact shapers with *all* the sturdy construction and operating features of large shapers, built down to size. Timken tapered roller bearings. Crank type ram drive. 3 speeds, 5 automatic cross feeds.

CLAUSING 18" DRILL PRESS

New, heavy-duty drill with many exclusive features for broad and thorough instruction. Drills to center of 18¼" circle. Capacity, ¾" in steel, 1" in cast iron—6½" spindle travel.



DRILL PRESSES

15" floor and bench models include new operating and durability features. 4-ball bearing "floating drive" for long accuracy life. Extra-heavy head, table, column, base. New depth control stop. 12¾" bench size also available.



ATLAS PRESS COMPANY

5312 North Pitcher St., Kalamazoo, Mich.

Complete Range of Woodworking for Your Shop

10" SAW



Cuts 3¼" deep; 20" x 27½" table, precision-ground. 12" right of blade. 13" ahead.—Extensions available. Quick-positioning fence, with vernier control.

NEW ATLAS 24" JIG SAW



Every part designed to minimize vibration and assure smooth, clean, accurate cuts. New appearance and efficiency. Four speeds for wood, metal, plastic, etc. 24" throat capacity . . . cuts 2¼" deep. 14" x 14" table tilts 45° right, 15° left, swivels 90°. Blade turns 90°. Removable arm. Complete splash lubrication. Scientifically balanced mechanism. Exclusive spring steel hold down.

NEW 8" and 10" SAWS



More rugged, easier to handle, quieter, smoother, and more accurate. NEW clear-vision, tenite safety guard . . . modern structural design . . . larger arbor and sealed-for-life ball bearings . . . dual V-belt drive . . . push-pull dual blade control . . . grip-form miter gauge . . . big easy-to-read tilt/arbor gauge . . . pyramid design stands. Famous ATLAS lift-off fence with vernier control.

12" BAND SAW



Ideal size for school shops. 14" x 14" precision-ground table tilts 45°. Cuts stock to 6¼" thick. Ball bearing wheels and blade supports.

SPINDLE SHAPER



15" x 21" precision-ground table. Table adjusts vertically, stationary spindle for smoother cutting. Ball bearings.



12" WOOD LATHE

36" between centers. Sealed for life ball bearings. Lever locks on tailstock and tool support base. 4 speeds.

BELT AND DISC SANDER



Sands any width boards, angles, curves, metals, plastics. 10" disc, 4" belt, table tilts 45°. Ball bearings.

6" JOINTER



42" long precision-ground table, 32" x 4½" tilting fence supported close to cutter head. Sealed-for-life ball bearings.

SEE YOUR *Atlas* DEALER

When you examine the solid construction and test the easy, accurate operation of these new Atlas tools—you'll know why more and more vocational education leaders are specifying Atlas. Your nearby Atlas dealer will be glad to show them to you. Write today for his name.

SEND FOR CATALOGS and FREE WALL CHARTS

CINCINNATI LATHE & TOOL CO.

Cincinnati 9, Ohio

TRAIN THEM ON THE TOOLS INDUSTRY USES

CINCINNATI
LATHE & TOOL CO.

CINCINNATI 9, OHIO

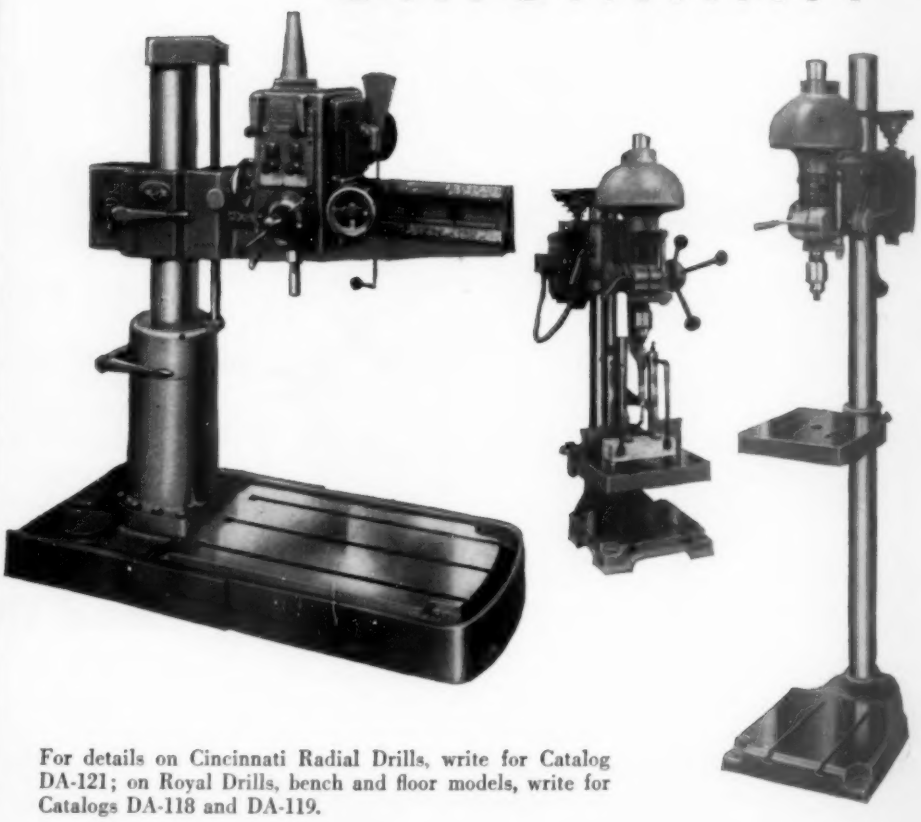
CINCINNATI LATHE & TOOL CO. CINCINNATI 9, OHIO



Cincinnati Tray-Top Lathes are available in swing sizes of 10", 12½", 15" and 18". Write for Catalog TA-108.

CINCINNATI

CINCINNATI



For details on Cincinnati Radial Drills, write for Catalog DA-121; on Royal Drills, bench and floor models, write for Catalogs DA-118 and DA-119.



Extra large, heat-treated, forged alloy steel spindles. Long, tapered key drive is accurate, durable, safe. One-piece, double-walled apron holds built-in oil reservoir. Spring-loaded safety clutch prevents overload damage.



CINCINNATI LATHES & DRILLS

- have all features needed for student instruction
- meet school budget requirements

ADAPTABLE to many operations on all common metals and plastics. 12 speeds, all geared, in geometric progression, 40-to-1 over-all ratio. 48 thread and feed changes. Top speeds to 1800 rpm.

EFFICIENT—Simple, direct motor drive; minimum gear contacts; spindles mounted in 3 large antifriction bearings; fully enclosed quick-change gearbox.

CONVENIENT—Centralized controls; instant speed selection with 3-lever, direct-reading, "color-match" dial; start-stop spindle control at apron and quick-change gearbox.

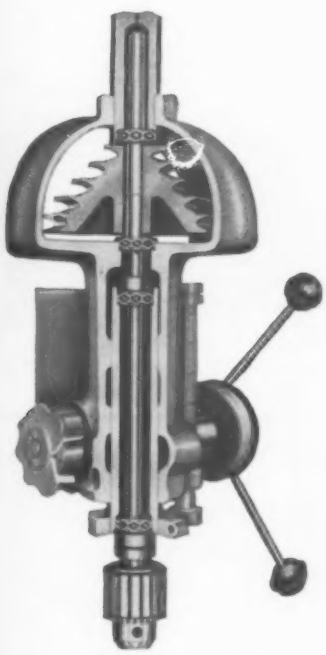
DURABLE—Antifriction and Oilite bearings, amply lubricated, integrally splined shafts and spindle; Flamatic hardened gears in headstock, apron and quick-change gearbox; ground bedways.

SAFE—Feed stops if stray objects fall on drop levers; chucks and faceplates can't spin off; door to electrical panel cannot open until power is "off".

SPACE SAVING—"Tray-Tops" keep tools off carriage wings and ways; two cabinet legs provide ample storage for chucks and faceplates.

TRAY-TOP LATHES

ROYAL & RADIAL DRILLS



Royal spindle heads feature four sealed-for-life ball bearings, adjustable clock-type spring spindle return, adjustable depth gage.

- 3′ arm, 7″ column, medium-duty radial
- light-duty, sensitive drills for metal or wood
- low-priced real machine tools

RADIAL DRILL—A fine production tool for radial drilling up to 1″—handles 90% of all drilling jobs. Low cost is combined with such high-priced features as: all-geared head with 9 spindle speeds (30-to-1 over-all ratio); automatic pressure lubrication; all shafts mounted on antifriction bearings; ground tubular steel column mounted on tapered roller bearings; trouble-proof column and arm clamps; hardened and ground head rail on arm; heavy ribbed base with built-in coolant tank.

ROYAL BENCH AND FLOOR DRILLS—16″ and 18″ models, built for sustained accuracy in long, hard usage. "Full floating" spindle drive. Spindle cone pulley mounted on two ball bearings to prevent belt pull being transmitted to the spindle. Two additional ball bearings carry radial and thrust loads. All four bearings have sealed-in lubrication; their ample size provides a wide safety margin for load and speed. Precision-ground alloy steel spindle has six integral splines. Vee type pulleys dynamically balanced for smooth performance. Exclusive hinged motor bracket provides fast, safe belt shifting without wrenches.

DURO METAL PRODUCTS COMPANY
2699 N. Kildare Avenue, Chicago 39, Ill.

Build YOUR shop around this new

DURO 10" TILTING ARBOR SAW



New model performs multiple operations with new ease, accuracy and safety

The finest saw money can buy! Actually a whole workshop in one BIG unit at a comparatively SMALL price! You can do professional rabbeting, mortising, crosscutting, mitering, ripping, dadoing, sanding and countless other operations with an accuracy, ease and safety that students and teachers will appreciate. This new Duro 10" Tilting Arbor Saw incorporates the latest improvements, the finest precision workmanship and most advanced safety features.

For the modern shop, the school shop that's going to be around for many, many years—this new Duro 10" model is ideal. Whether you're building a completely new shop or just adding a unit, it will pay you to investigate the many exclusive features embodied in this outstanding saw. Check the specifications and see why the Duro 10" circular saw is best for your shop and your students.

Send for the New 1954 Duro Catalog

It's yours FREE. Contains full details and specifications on this remarkable 10" Saw. Also contains the complete Duro line of precision machines in many styles and models to suit every type of school budget. Write for your copy today.



Saw Specifications

Vertical depth of cut—3¼"; depth of cut at 45°—2-7/16"; table size—33" x 20"; with extensions 33" x 38"; spindle bearings—ball; distance ahead of blade—14¾"; max. distance blade to fence—25½"; dado head cap.—5" or 6"; overall size—height 44½", depth 43½", width 50". Weight 430 lbs.

THE DURO LINE OFFERS EVERY TOOL FOR THE MODERN SCHOOL SHOP



Also Sanders, Routers, Shapers and a complete line of accessories.

HAAG MACHINE COMPANY, INC.

Dept. ASP, Hawthorne, New Jersey



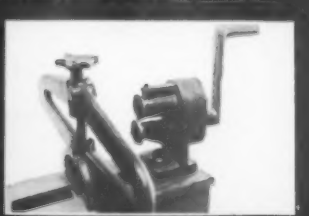
These are typical projects which can easily be turned out on the Haag SPIN MASTER ®



Hard wood or metal spinning chucks for shop projects like those above are available at low cost.



The above equipment is furnished with the SS 15 Spin-master® #0 ball bearing center with No. 2 Morse Taper Shank, 6-inch face plate, tail-stock and rest bank wrench; set of 5 spinning tools with hard wood handles.

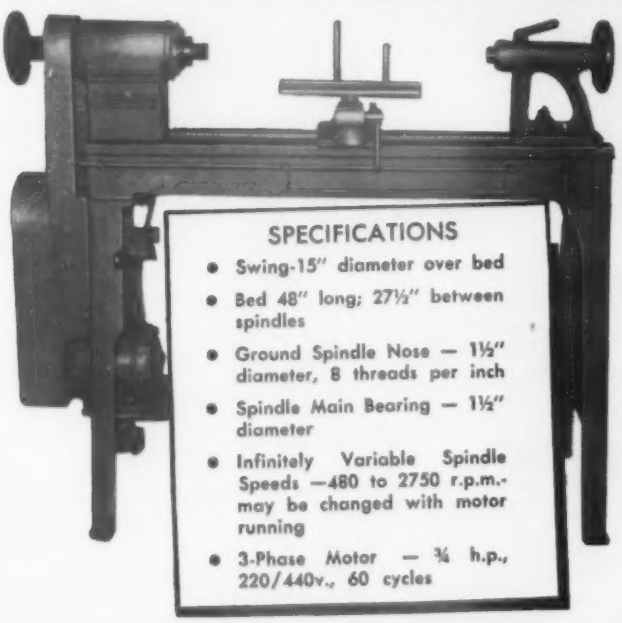


SS 15 Circle Cutting attachment . . . lightweight and portable . . . cuts circles up to 15" diameter in #16 gauge aluminum, #18 brass and copper, #20 soft steel. Also available at low cost.

Metal Spinning is easier for teacher and student on the NEW Haag

MODEL SS 15

SPIN MASTER®



SPECIFICATIONS

- Swing-15" diameter over bed
- Bed 48" long; 27½" between spindles
- Ground Spindle Nose — 1½" diameter, 8 threads per inch
- Spindle Main Bearing — 1½" diameter
- Infinitely Variable Spindle Speeds —480 to 2750 r.p.m.-may be changed with motor running
- 3-Phase Motor — ¾ h.p., 220/440v., 60 cycles

The **SPIN MASTER** ® 15-inch metal spinning lathe has proven, through the years, its superiority in ease of operation, minimum maintenance and longer life . . . in industry and school shops, both general and metal. Now, the **New Model SS-15 SPIN MASTER** ® offers additional exclusive features including: simplified modern design, infinitely variable speed drive, stop-start safety bar and the versatile 1-1/2" - 8 thread nose spindle. Although specifically designed for metal spinning, the **SS-15 SPIN MASTER** ® is ideal for wood turning, thereby making it the perfect choice for school shops operating on a limited budget.

Write for additional detailed information and prices on school letterhead to:

HAAG MACHINE COMPANY, INC.

DEPT. ASP HAWTHORNE, NEW JERSEY

THE R. K. LeBLOND MACHINE TOOL CO.

DEPT. S
Cincinnati 8, Ohio

teach Big-Lathe practice on Machines with Big-Lathe Features

You can be sure you're teaching the latest in big-lathe practice when you use LeBlond Regals. This low-cost lathe with big-lathe features is a product of 63 years of machine tool experience, combined with the facilities of a plant which builds a complete line of 76 lathe models.

Geared Headstock—Power is transmitted efficiently from motor to spindle at eight conveniently-selected speeds.

Quick-Change Feed Box—56 feeds and threads can be chosen simply and quickly through this fool-proof mechanism.

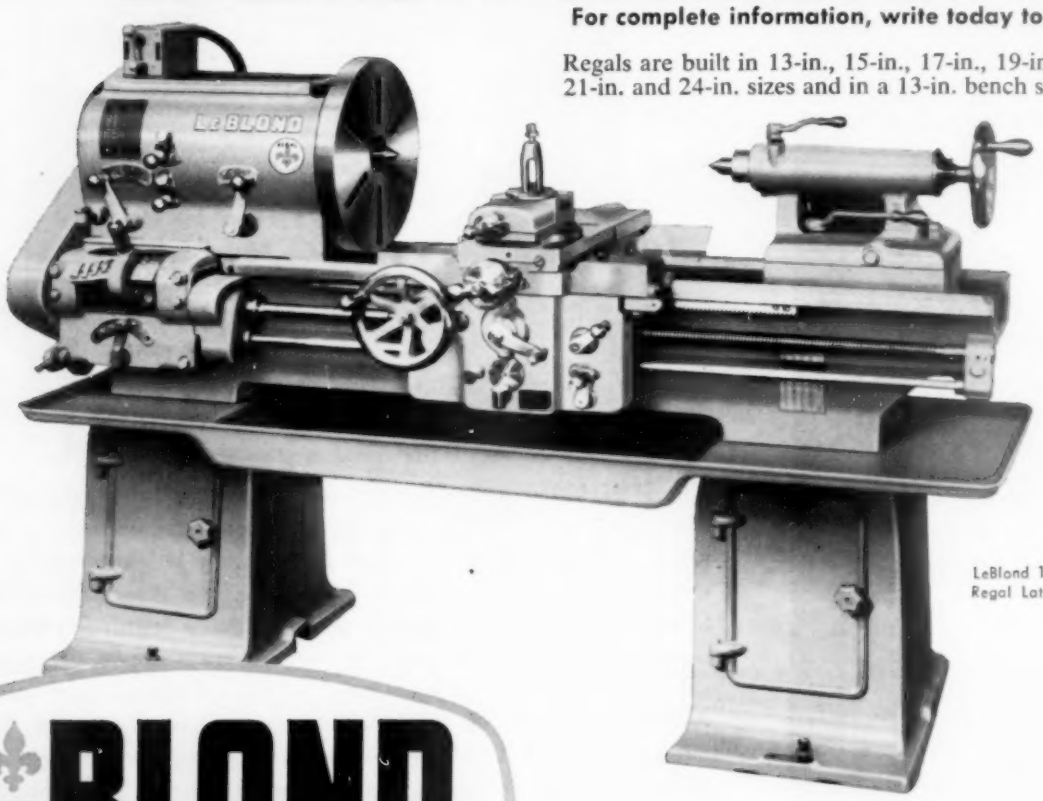
Leadscrew and Feed Rod—*Both* are incorporated on the Regal to give you accurate thread-chasing and dependable feeds.

Taper Key Drive Spindle Nose—Safe, rugged and accurate positioning of chucks, faceplates and fixtures is assured in this big-lathe feature.

One-Piece Apron—Long-life sturdiness and protection from dirt and misalignment are built into the double-wall apron.

For complete information, write today to Dept. S.

Regals are built in 13-in., 15-in., 17-in., 19-in., 21-in. and 24-in. sizes and in a 13-in. bench size.



LeBlond 17"
Regal Lathe

LeBLOND Regals

World's largest builder of a complete line of lathes.

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

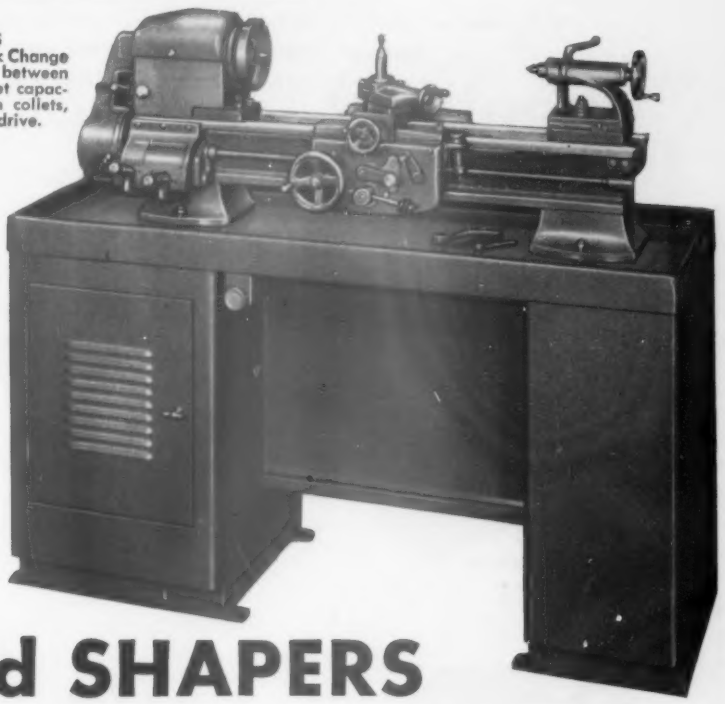
LOGAN ENGINEERING COMPANY

4901 West Lawrence Avenue, Chicago 30, Illinois

The STUDENT,
The TEACHER,
The BUDGET
are at their best
with

Logan

No. 1875
10" Swing, Quick Change Gear Lathe, 24" between centers, ½" collet capacity with draw-in collets, 16-speed V-belt drive.



LATHES and SHAPERS



No. 1920
Quick Change Gear Lathe with 11" swing, 1" Collet Capacity, 1⅜" Spindle Hole, 24" and 36" between centers, 16-speed V-belt drive.

No. 2957-V
12" Swing, Quick Change Gear Lathe with Variable Speed Drive, 1" Collet Capacity, 1⅜" Spindle Hole, 35" centers.



Operating a Logan Lathe or Shaper, the student has the advantage of using one of American industry's standard tools. For his safety, V-belt drive, headstock, countershaft and motor are enclosed. Controls and switches on both lathe and shaper are easily accessible.

The accuracy, versatility and capacity of Logan Lathes and Shapers enables the metal-working teacher to plan a wide range of stimulating shop projects that hold the interest and maintain the development of more advanced students. Compact, space-saving design makes them ideal for multiple installations.

Budget-wise, Logan Lathes and Shapers bring a double benefit. First: rugged Logan construction keeps maintenance cost at minimum. Second: major economies made possible by efficient production methods in the modern Logan plant bring you these advanced design tools at substantial price savings.

Write for Full Catalog Information

Brief Logan Lathe Facts

Collet Capacity, up to 1"

Spindle Hole, up to 1⅜"

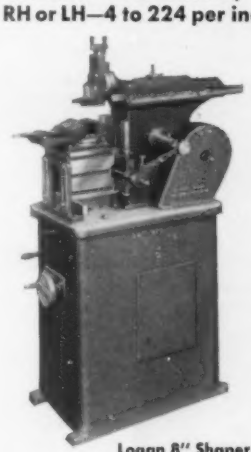
Swing over bed, up to 12"

Ball Bearing Spindle

16 Spindle Speeds, 45 to 1500 rpm

Choice of Double V-Belt Drive or Variable-Speed Drive at no extra cost

Threads—48 selections, RH or LH—4 to 224 per inch



Logan 8" Shaper
Powerful 8½" stroke, variable speed drive, 6 automatic feeds in either direction.

NIAGARA MACHINE & TOOL WORKS

Buffalo 11, N. Y.

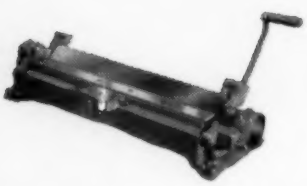
America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA

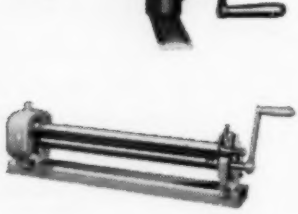
Dealers in principal U.S. Cities and major foreign countries

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To Help You Layout and Equip Your Sheet Metal Working Shop









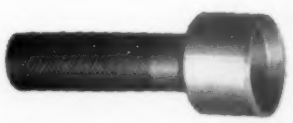




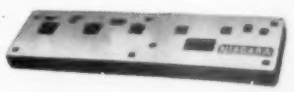


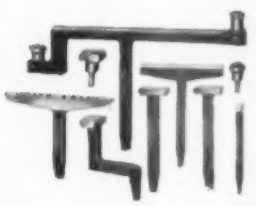
● School architects and heads of Industrial Educational Departments find it valuable for planning and equipping shops to accommodate various size classes.







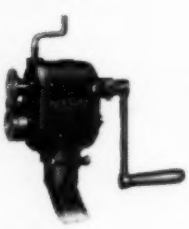




TRAIN YOUR STUDENTS ON THE SAME NIAGARA MACHINES USED IN ACTUAL WORK

The selection of Niagara machines and tools has a very practical bearing on vocational training because they are identically the same machines that are used in everyday commercial work. What your students learn in your shop, they can apply easily and naturally when they step out into industry.







NIAGARA

75 Years of Experience in Serving the Metal Working Industry

OLIVER MACHINERY COMPANY

Established 1890

Grand Rapids 2, Michigan

"Oliver" Woodworking Machinery

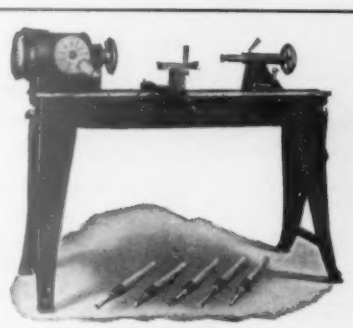
Engineered to give vocational shops the most for their dollar

GIVE your students a solid foundation for progress when they enter industry. Train them *right* with "Oliver" machines. Instructors in over 2350 vocational shops *know* "Oliver" equipment gives the finest service year after year, for it is built to pay its way on factory floors the world over. Such equipment is essential for practical, thorough training. On this page are shown a few machines of a complete line for vocational shops.



No. 91
Hollow Chisel
MORTISER

Cuts clean mortises rapidly. Stroke from 2½" to 4". Takes chisels ¼" to ¾" square. With 3 h-p. motor it handles chisels up to 1½" square. Offered with universal compound table or plain table.



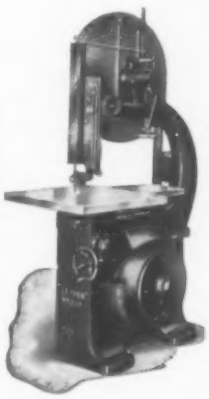
METAL SPINNING LATHE

Lathe shown above has 12" diameter swing. Extra heavy bed and large bearings enable it to withstand tremendous pressures. Motor driven headstock has dial control. Spindle speeds adjustable from 800 to 2750 r.p.m. Ball bearing tail center. "Oliver" Metal Spinning Lathes also made in sizes with 16", 20", 24" and 30" swing.

"Oliver" makes a complete line of the finest woodturning lathes

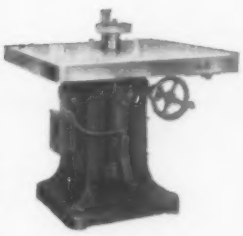
No. 217D
BAND SAW

Has rubber faced disk wheels 30" diameter. Table 20"x28" tilts up to 45° to right, 10° to left. Uses blades ⅛" to 1½" wide. Offered with high-speed motor to cut wood, plastics, etc. Foot brake with cutout switch for lower wheel, automatic brake for upper wheel. Accurate, quick adjustments. "Oliver" Band Saws also made in 18", 36", 38" sizes.



No. 287T
SHAPER

This Shaper is one of five built in single and double spindle types. Has 42" x 42" table. Spindle runs true at speeds up to 8400 r.p.m. Produces smoothest work feeding stock to cutter with or against the grain.





No. 194B
BORER

Handles wide range of vertical boring operations. Bores holes up to ¾" diameter in hardwood, to 1½" diameter in softwood, in edge of 22-inch stock with table, 36-inch without table. Table has 22" vertical adjustment. Ball bearing motor-on-spindle drive. Compact, sturdy design.



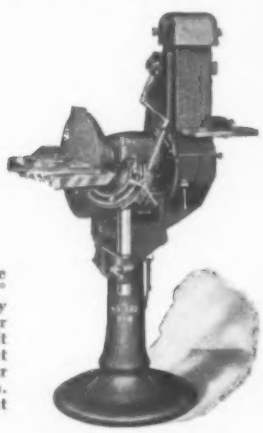
No. 299
SURFACER

Sturdy and compact. Takes stock up to 24" wide, 8" thick, short as 11". Power driven rolls feed 18' to 40' a minute. Built - in knife jointer and grinder always ready for use. Other single and double Surfacers from 18" to 36".



No. 384 Oilstone
TOOL GRINDER

Quickly sharpens plane bits, chisels, knives, etc. Has one coarse and one fine oilstone, emery wheel, tool rest, and adjustable tool rest table for parallel grinding. A heavier model also has emery cone and leather stropping wheel.



No. 182DB
Disk-Belt
SANDER

Has 13" disk. Table tilts 45° down, 25° up. Gauges simplify angular and circular work. A 6-inch belt sanding attachment runs in vertical or horizontal position. Available without belt sander.



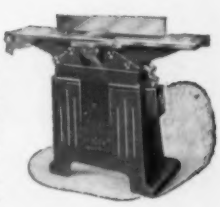
"OLIVER" EQUIPMENT FOR VOCATIONAL SHOPS

Circular Saw Benches	Wood Turning Lathes
Straitline Cut-off Saws	Sanders—Belt, Disk, Drum
Jig Saws	Shapers
Band Saws	Tenoner
Horizontal Borers	Jointers
Vertical Borers	Oilstone Tool Grinders
Mortisers	Knives and Saws
Wood Trimmers	
Metal Spinning Lathes	

Send for illustrated bulletins containing full details

No. 144
JOINTER

This 8-inch Jointer has direct motor drive and sturdy one-piece bed. Safety cylinder has three knives. Oversize ball bearings for years of smooth operation. "Oliver" jointers come in capacities from 6" to 30".





No. 270
Tilting Arbor
SAW BENCH

Cuts a perfect miter, cuts off to length, rips to width, dadoes accurately. Rips 29" wide with plain fence, or 24" with universal fence. Cross cuts to 18" wide, 3" thick.

SHOPMASTER, INC.

1214 Third Street S., Minneapolis, Minn.

Start tomorrow's "DO-IT-YOURSELF" craftsmen with tools they'll use in their homes

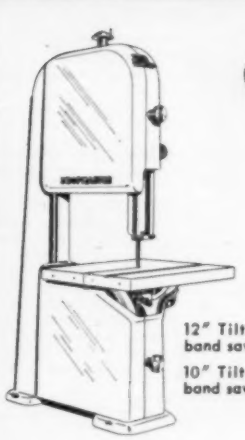


It's common sense to train students with SHOPMASTER Tools. They're designed for easy operation, yet efficient enough to meet high professional standards.

SHOPMASTER Tools have the quality and ruggedness for school workshops . . . and at low prices.

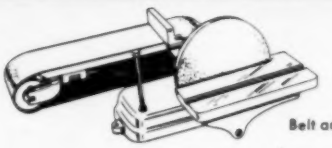
Using SHOPMASTER Tools in schools will give students practical ideas. They'll have the know-how to operate industrial equipment . . . they'll also know how to use power tools that fit into any home.

Teach them on a SHOPMASTER Tool. It's the tool they'll use tomorrow at home.

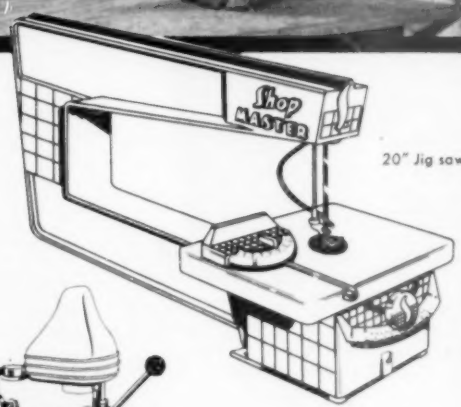


12" Tilting table band saw $89.50

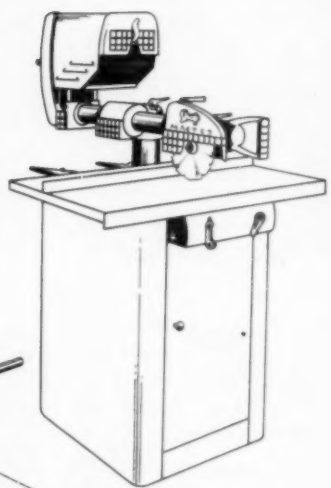
10" Tilting table band saw $49.95

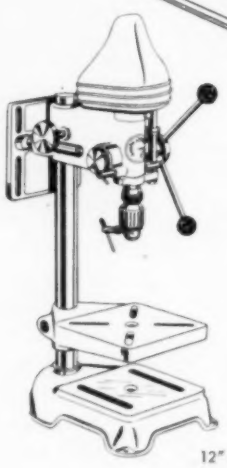


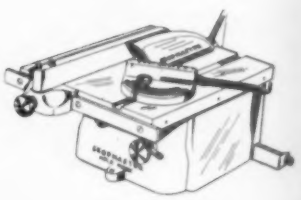
Belt and disc sander $54.00



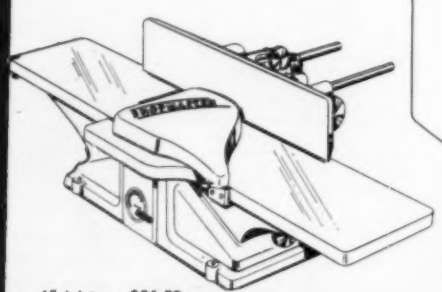
20" Jig saw $39.95







8" tilting arbor saw $82.95



6" Jointer $86.50

4" Jointer $51.95

SHOPMASTER Universal Tool—A combination tool that is a radial arm circle saw, radial arm drill press, sander, shaper, router, lathe, jointer, grinder, buffer, and power plant all in one. $269.95

12" Drill press $49.95

12" Floor model drill press $55.50

RELY ON **Shopmaster**

1214 Third Street S.
Minneapolis, Minnesota

SOUTH BEND LATHE WORKS

South Bend 22, Indiana

SOUTH BEND MACHINE-TOOLS

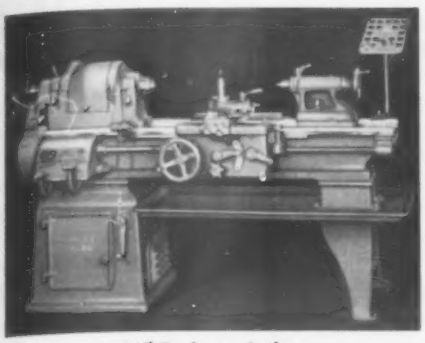
Make Teaching Easier

These popular machine tools make teaching easier because students learn faster on them. Less supervision is required because their simplicity of design and safety features promote faster development of machine handling skill. Also, more time is left for productive work — projects are completed quicker. Student interest is kept at a high level. Less material is spoiled.

Write, requesting information on the machines in which you are interested—find out why they are favorites of shop teachers everywhere.



Lathe Tools
And Attachments



16" Toolroom Lathe



14½" Quick Change Gear Lathe



13" Toolroom Lathe



14" Drill Press



7" Bench Shaper



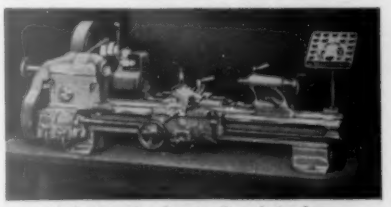
10" Quick Change Gear Lathe



9" Floor Lathe



Pedestal Grinder



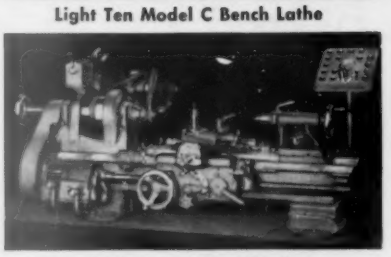
Light Ten Toolroom Bench Lathe



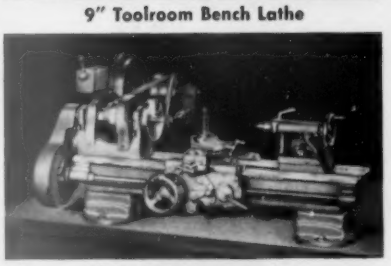
Light Ten Model B Bench Lathe



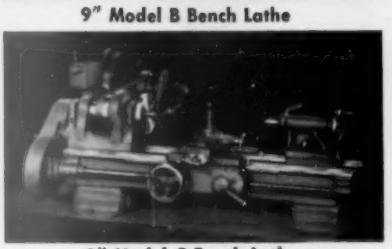
Light Ten Model C Bench Lathe



9" Toolroom Bench Lathe



9" Model B Bench Lathe



9" Model C Bench Lathe

BOOKS AND FILMS FOR SHOP CLASSES



Shop classes get off to a good start with South Bend teaching aids. Teaching is easier with text instruction from the "How To" series —"How to Run a Lathe," "How to Run a Drill Press," "How to Run a Shaper."

A Machine Shop Course Book and several wall charts are also available at small cost.

Motion pictures on lathe operation can be had on a free-loan basis. Three 16 mm color sound films cover "The Lathe," "Plain Turning" and "Grinding Cutter Bits." They show the lathe, its principal operations and major applications.

Write for Bulletin 5329, which also includes 3-D scale model shop planning and color slides.



WALKER-TURNER DIVISION

KEARNEY & TRECKER CORPORATION

PLAINFIELD, NEW JERSEY



BAND SAW

NEW 16" MODEL—with Variable Speed Drive—50 to 4500 SFM. Cuts metal, plastics, wood. Blade to frame 16"; upper guide to table 8". Infinitely variable speeds without belt or pulley changing. Table size 18" x 19"; tilts to 45°. Improved guides adjust to all blade widths.
Also available in single speed models for wood or plastics cutting.



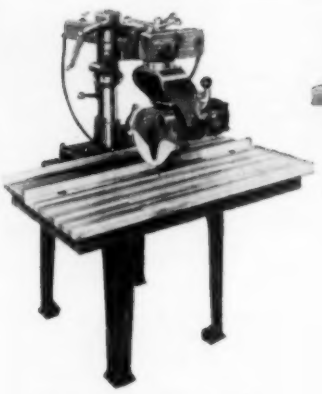
VERTICAL SPINDLE SHAPER

Two speeds, 7000 and 11,000 r.p.m., with dynamically balanced pulley for smooth operation. Independently adjustable guides. Complete cutter guarding. Graduated spindle adjustment. New type nylon cord reinforced V belt drive.
Spindle travel 3" on dovetail ways. Cast grey iron table, 22" x 33". One piece heavy gauge steel base. Totally enclosed motor available.

walker-Turner

LIGHT-HEAVYWEIGHTS

Walker-Turner *Light-Heavyweights* permit you to equip your school with genuine industrial machines without heavy investment. Safe, rugged, efficient—Walker-Turner *Light-Heavyweights* train your students on machines with capacity for a wide variety of jobs in both metal working and wood working . . . machines they will actually use in industry. The slightly higher initial cost of Walker-Turner *Light-*



RADIAL SAW (900)

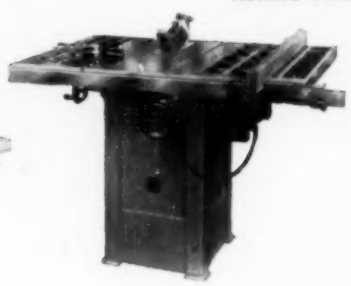
A work-horse for ripping, mitering, shaping, tenoning, rabbeting, dadoing, routing and dozens of other jobs. New offset drive gets greater capacity (depth of cut) with smaller blades. Full visibility, easy to operate. Works at any angle, 12" blade cuts 4⅝" deep. Ram travel 24". 1½ and 3 h.p. models.



6" JOINTER

Dual purpose guard permits work to be fed under it while operator's left hand, resting on it, applies necessary pressure. Totally enclosed motor available. Texrope drive with triple V-belts permits efficient close-coupled motor connection. Solid steel 3-knife cutterhead, rabbets to ½" deep. Speed 3900 r.p.m.

TILTING ARBOR SAWS



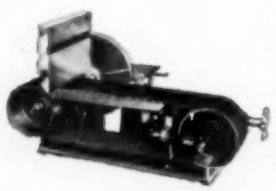
10" MODEL

Triple V belt drive. Capacity 3⅛" with 10" blade, dado 1⅛". Table 26¾" wide x 32½" deep with extension. With side extensions 44¾" wide. Speed 3800 r.p.m. Fence locks front and rear. Totally enclosed motor available.



8" MODEL

Capacity 2⅝", 1½" at 45°. 6" dado, 1⅝". Table size, with extensions 23" x 37". Spindle speed 4000 r.p.m. Aluminum rip fence has micrometer adjustment. V belt drive. Guard and splitter supplied. Totally enclosed motor available.

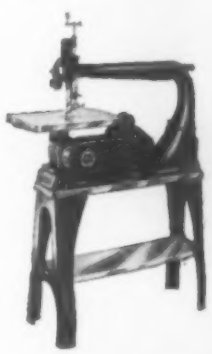


◀ BELT and DISC SURFACER

Both tables tilt from 90° to 45°. One piece cast iron frame, dust-sealed ball bearings. V-belt drive with built-in guard. Aluminum alloy sanding disc, 10". Belt 4" wide, distance between pulley centers, 18½". Belt speeds 900, 1760 and 3200 r.p.m., disc 660, 1280 and 2350 r.p.m.

24", 4-SPEED JIG SAW ▶

Patented blade tensioner makes possible rapid blade changes. Tension adjustments can be made while machine is running. Positive action, built-in-base blower delivers constant air pressure. Adjustable saw guide and hold-down. Arm movable to sides, removable for large work. Table size: 12¾" x 16" tilts to 45°. Four speeds: 600, 900, 1250, 1740 r.p.m. with 1740 r.p.m. motor.



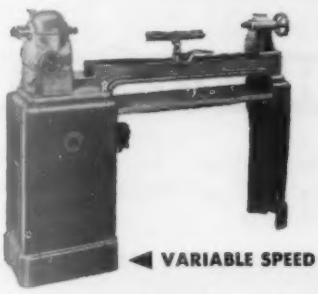
WALKER-TURNER DIVISION

KEARNEY & TRECKER CORPORATION

PLAINFIELD, NEW JERSEY

for Metal and Woodworking Operations

Heavyweights will be more than repaid in greater use-ability, longer trouble-free life, safer operation. No hobbyist machine can approach *Light-Heavyweights* in simplicity and sturdiness of construction in frame or moving parts. There is a *Light-Heavyweight* machine designed to do practically any job in your school shop. Write for the name of your nearest Walker-Turner distributor. He will be glad to demonstrate.

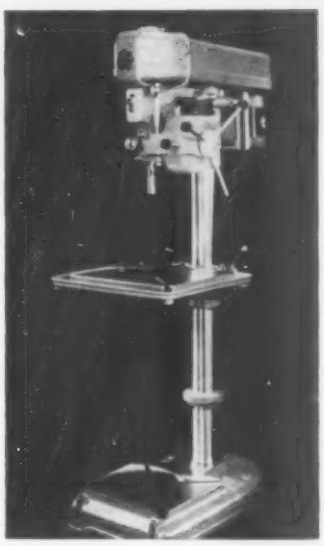


◀ **VARIABLE SPEED LATHE**

Heavy cast iron headstock and double row pre-loaded spindle bearings and carefully machined cast iron gap bed, make it ideal for wood turning and metal spinning. Spindle speeds, changed while machine is running, controlled by hand wheel in front of headstock. Speeds from 660 to 3550 r.p.m. with 1740 r.p.m. motor. Swing over gap 15½", over bed 12", distance between centers 38".

20" DRILL PRESSES Hand or Power Feed ▶

Heavy one-piece cast iron head is line bored for accuracy. 6" spindle travel, adjustable spring return. Capacity ¾" in steel, 1" in cast iron. Spindle speeds 400, 800, 1200, 1800, 2600 r.p.m. using 1740 r.p.m. motor. 10 spline spindle. Available No. 2 and No. 3 Morse Taper Spindle. Bench, floor, and multi-spindle models.





◀ **15" DRILL PRESSES**

Available in bench and floor models. Wide speed range. Four step spindle and motor pulleys develop 600, 1250, 2440 and 5000 r.p.m. with 1740 r.p.m. motor. Slo-speed attachments available. Adaptable for sanding, grinding, mortising, shaping and many other operations. New head design—4 ball bearings, six spline spindle. Spindle travel 4¼", and 6". 1 to 6 spindle models.



◀ **RADIAL DRILL PRESS**

Drills to center of 62" circle or anywhere on sheet stock up to 5 ft. wide. Handles all drilling and tapping jobs to ½" in cast iron. Built-in ball bearing jackshaft gives wide speed range and utility. Drill head, ram and cradle may be swung in complete circle. Locks securely in any position.

Six spline, full floating type spindle travels 4¼". Ram travel 18". Fifteen spindle speeds; from 160 to 8300 r.p.m. using 1740 motor, 110 to 5400 using 1140 motor.



MOTOR GRINDERS

Totally enclosed motor—special shaft seals prevent dust from damaging vital parts. Motor end bells are extended, allowing use of both sides of grinding wheels. Heavy-duty wheel guards with removable covers. Adjustable tool rests. 7" wheel operates at 3450 r.p.m. with ½" h.p. single phase motor. Other sizes and combination sander-grinder available.

Practical Aids for Industrial Arts Teachers

Written by a man who has spent his entire career in Industrial Arts and Vocational Education work, these aids are new, easy to understand, entirely practical. Prices are based on cost only.

SHOP PLANNING MANUAL — $1.00 each. First comprehensive manual. 48 pages, over 750 silhouettes of shop equipment.

TEACHING AIDS — FREE set. Complete 4-page folders on care and use of individual tools.

MACHINE SAFETY CHARTS — 10c per set. Ten cards — each message has a positive approach. Helps keep students safety conscious.

STUDENT PLAN SHEETS — 50c per hundred. Two-page form for use by students to plan their own work.

FREE CATALOG — Describes complete line of Walker-Turner metal-cutting and woodworking machines.

Your order along with proper amount will get prompt attention from the factory. Address WALKER-TURNER DIV., Educational Dept. AS, Plainfield, N. J.

WALKER-TURNER

• DIVISION •

KEARNEY AND TRECKER CORPORATION

PLAINFIELD, N. J.

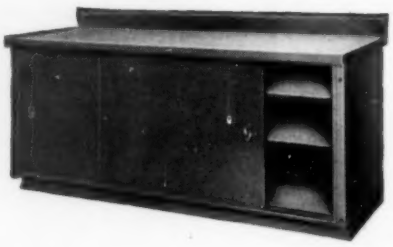
Drill Presses—Hand and Power Feed • Radial Drills
Wood and Metal Cutting Band Saws • Tilting Arbor Saws
Radial Saws • Jig Saws • Lathes • Spindle Shapers
Jointers • Belt and Disc Surfacers • Flexible Shaft Machines

STANDARD PRESSED STEEL CO.

Jenkintown 15, Pennsylvania

HALLOWELL® SHOP EQUIPMENT OF STEEL

Standardized, ready-made Work Benches, Shop Desks, Tool Stands, Posture Stools and Chairs, Cabinets.









STEEL STOOL
Strong, welded construction. Heights from 18" to 30". Also adjustable models.



LABORATORY or DRAFTSMAN'S STOOL
Heights from 17" to 27". 4" screw adjustment. With or without footrest.

HALLOWELL Work Benches can be used as individual or continuous units, require no bolting to the floor, are easily installed and maintained.

HALLOWELL CABINET BENCHES

Standard Lengths: 4', 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Heights:** steel top—35¼"; Presdwood top—35 7/16"; laminated wood top (1¾" thick)—35", (2⅝" thick)—35⅞". **Standard Widths:** steel and Presdwood—23½" and 29", laminated wood—24" and 30".

Steel tops widely used as "paint and stain" or "glue" benches. Wood tops ideal for machine shop work. Benches have fully enclosed bases and close-fitting sliding doors for safe storage of paint, shellac and other flammable materials. Doors are fitted with cylinder lock.

HALLOWELL STANDARD BENCHES

Standard Lengths: 3', 4', 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Leg Heights:** 29", 31¼" and 33½". **Standard Widths:** 23½", 29" and 36".

Wood tops widely used for "woodworking" and as "vise benches." Steel tops frequently specified as "soldering benches," but equally adaptable to a wide variety of general shop uses. Standard drawer tier units, storage cabinets and other accessories also available.

HALLOWELL MULTIPLE UNIT BENCHES

Standard Lengths: 5' and 6'. **Standard Top Materials:** steel, Presdwood, laminated wood. **Standard Heights:** 31¼" and 33½", depending on base used. **Standard Widths:** nominally 24" and 30".

Storage space is built into the bench, encourages better housekeeping, neater shops. Tools and supplies can be stored conveniently in either cabinets or drawers. Models are available with 2 cabinets, 2 drawer tiers or 1 drawer tier and 1 cabinet.



CARRY TOOL
The handier tool stand. (Also fully enclosed portable tool cabinets.)

Bulletins 701, 702 and 841 contain complete information on HALLOWELL Benches. Other items of HALLOWELL Shop Equipment are described in other literature.

ELECTRIKILN DIVISION

The Harrop Ceramic Service Co., Dept. U,
3470 East 5th Ave., Columbus 19, Ohio

ELECTRIKILNS . . . specially suited for classroom and laboratory

Designed simply . . . for dependable, economical operation . . . fast-firing ElectriKilns have proved themselves for years in schools and colleges throughout the country. WRITE US for representative list of installations . . . then write these users for their own opinion of ElectriKilns.

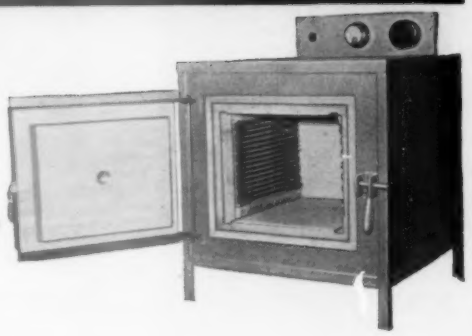
"HI-FIRE" Top-Loading ElectriKiln Model HTL-16, for Cone 8 (2300°F.)



All Top-Loaders have extra-long-life elements in recessed grooves . . . means easier replacement, no loose staples.

Model No.	FIRING CHAMBER			OUTSIDE DIMENSIONS			Firing Chamber	Max. Temp.
	Width	Length	Height	Width	Length	Height	Cu. In.	
TL-4	11	11	6½	19½	19½	19	786.5	2000
TL-5	11	11	10	19½	19½	19½	1210	2000
TL-6	12	12	10	20½	20½	19½	1440	2000
TL-8	18	18	15	26½	26½	24½	4860	2000
HTL-16	16	16	15	25	25	30	3840	2300

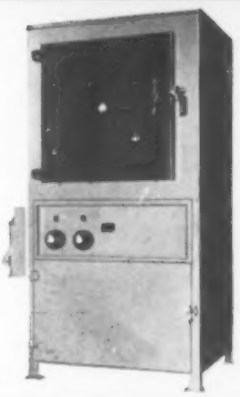
Typical bench Side-Loader . . . Model C-500



Bench and Floor models . . . wide range of capacities and accessory controls.

Side-Loading Model No.	Firing Chamber				Max. Temp.
	Width	Depth	Height	Cu. In.	
HT-15	14	14	15	2744	2300° F
HT-09	9	9	9	729	2300° F
C-1214	12	14	11	1848	2000° F
C-500	7½	9	11	742	2000° F
509	9	9	9	729	2000° F

Representative Floor Side-Loader . . . Model 819



Open-type heating elements have long life . . . placed under hearth and on sides to insure even heat distribution.

Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL EXTERIOR		
	Width	Depth	Height		Width	Depth	Height
715	14"	14"	15"	2840	29"	30"	60"
819	18"	18"	19"	6156	33"	35"	65"
920	20"	22"	22"	9680	35"	40"	72"

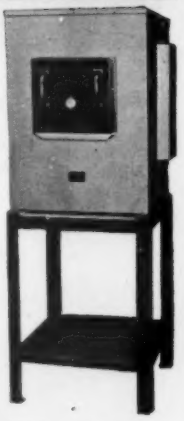
Globar equipped LTG and GB Series

Non-metallic Globar* heating elements permit higher firing temperatures . . . kilns do not require stacks or chimney outlet.

Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL			Max. Temp.	K.W. Input Without Transformer
	Width	Height	Depth		Width	Height	Depth		
LTG- 9	9"	9"	9"	729	25"	30"	21"	2500	5 K.W.
LTG-12	12"	12"	12"	1728	32"	60"	32"	2500	12 K.W.

Model No.	FIRING CHAMBER			Chamber Cubic Inches	OVERALL*			Max. Temp.	K.W. Input Without Transformer
	W	H	D		W	H	D		
GB 8	8"	9"	9"	648"	27½"	56"	29"	2700°F.	This Kiln to be operated with transformer only
GB10	10"	11"	11"	1210"	33"	60"	38"	2700°F.	16 K.W.
GB12	12"	12"	17"	2448"	35"	60"	46"	2700°F.	16 K.W.
GB15	15"	15"	19"	4275"	38½"	66"	46"	2700°F.	25 & K.W.
GB20	20"	20"	25"	10,000"	44½"	66"	55"	2700°F.	30 K.W.

*Does not include space switch panel and transformer.



*Globar is a registered trade mark of, and indicates manufacture by, the Carborundum Company.

MANY OTHER ELECTRIKILNS including Enamelling and Muffle types. SUPPLIES glazes, colors, finishes . . . tools, kiln furniture and supplies, wheels . . . nets and laces

WRITE FOR COMPLETE CATALOG

. . . to HARROP, Your One Reliable Source for Every Ceramic Need.

PERENY EQUIPMENT COMPANY

Dept. W., 893 Chambers Road, Columbus 12, Ohio

PERECO KILNS AND FURNACES

Here are a few typical items in the complete line of PERECO EQUIPMENT for many of your school needs

Easy to use, compact, durable, and priced amazingly low!



FULLY SELF-CONTAINED MODELS

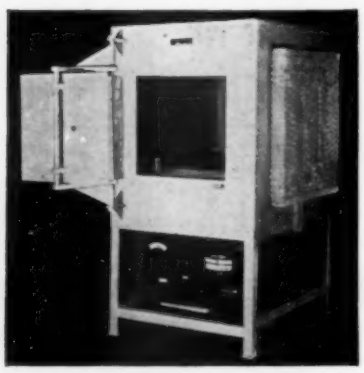
including instruments for accurate control

"CB SERIES"—Students in ceramics and metals develop special skills more readily from practical experience with Pereco industrial-type equipment. An ideal training unit, the electrically operated CB-55 (left) is one of a series of tool hardening, brazing, sintering and general shop furnaces.

"LB SERIES"—One of a group of ceramic kilns, the LB-74 (right) with built-in controls and instruments, saves space in crowded labs or classrooms. Globar non-metallic elements quickly and evenly heat the thickly insulated working chamber, reaching 2700° F. for continuous use and up to 3000° F. for short runs.

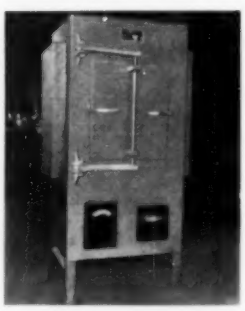


PERECO OFFERS A WIDE CHOICE OF TYPES AND SIZES



Some for high temperatures

Pereco Electric Kilns and Furnaces cover a wide range of heat applications, firing schedules, and work capacities. This simplifies selection of the most practical equipment for instructional use. The SM-7800 at left, for example, is a stock unit that provides easily regulated temperatures up to 2700° F. There are many more.



Others for low. . .

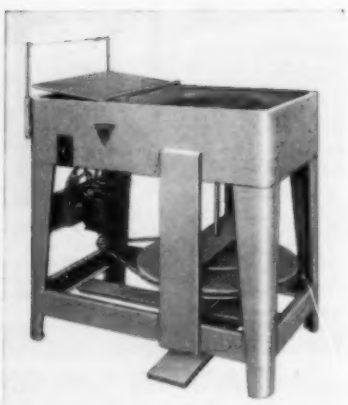
A variety of efficient, bench-type, electric units in the Pereco line have ample capacity for classroom projects requiring relatively low temperatures. All are handily portable, simple to operate, safe and clean. We invite your inquiries.

• NEW LINE OF PERECO GAS UNITS ALSO AVAILABLE

Standard and special models for any temperature from 450° to 5000° F.



OTHER TEACHING AIDS



Electric Melting Pots— for lead, tin, and other nonferrous metals

This equipment is complete and ready to use for melting type metals in print shops, for lead or tin dipping, etc. Automatic temperature controller keeps heat constant at desired levels. Model L-818 shown here has capacity for 400 lbs. of tin. Another smaller Model L-810 holds 250 lbs. of tin. Both of these reach a maximum temperature of 900° F.

Potters Wheels—motorized or kick type

Pereco Patented Variable Speed Wheels, with self-aligning ball-bearing mount and foot-controlled stepless friction clutch, assure smoothly regulated, mechanical turn of clay in work. Kick Wheel is similar to motor-driven unit shown here. Either wood or all-steel frames.

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• Ball Mills • Whirlers • Ceramic Hand Tools

REPUBLIC STEEL
BERGER MANUFACTURING DIVISION

Canton 5, Ohio

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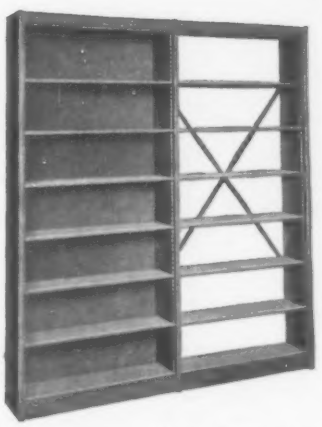
BERGER STEEL FILING CABINETS (above) 5, 4, 3 and 2-drawer models accommodate all papers, records and books in common use. Case and drawer members are high-quality steel, electrically welded to rigid, one-piece construction. They will stand exceptionally hard usage and give years of satisfaction. Interchangeable drawers roll easily on ball-bearing slides. Rubber bumpers deaden sound. New STA-LOCK compressors are positive locking. Standard baked-enamel finishes are neutral green, rich walnut and mahogany grains, and modern platinum gray. Write for detailed catalog.



BERGER DESKS AND TABLES (left) The latest in school office furniture. Completely new in design and features. New sight-saving top eliminates glare, is easy on the eyes. New, more comfortable 29" height—adjustable to 30½". Interchangeable tops, pedestals and drawers. Built on 15" modular principle, desk illustrated has easy-to-reach 60" x 30" top. Conference top with 9" overhang on ends and rear is available. Berger Tables are perfect matching companion units. Write for literature.



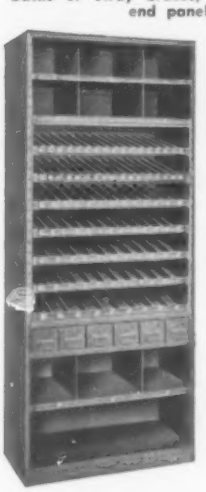
BERGER STEEL LOCKERS (above) Scientifically constructed of heavy-gauge steel to withstand a lifetime of hard usage with little depreciation. Standard finishes are neutral green, gray and beige. Type 55 illustrated is the world's most popular general purposes model. It can be used free-standing or recessed in corridor walls. Many other styles and models to choose from. Write for catalogs.



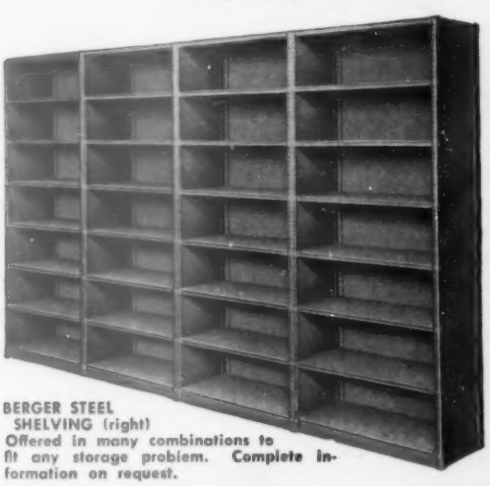
BERGER STEEL BOOK SHELF UNITS (above) Sturdy bolted construction, 84" high for general library use, 90" high for law libraries. Six plain steel shelves fit slotted uprights, are easily adjustable on 1" centers and are designed to prevent accidental removal. No obstructions to removal of end books. Furnished with backs or sway braces, with or without end panels.



BERGER STEEL STORAGE WARDROBE AND COMBINATION CABINETS (above) Are large and roomy, serve an unlimited number of uses. Strongly constructed of heavy steel, properly reinforced. Baked enamel finishes are platinum gray, olive green, grained walnut and mahogany. Double-Door Storage Cabinet illustrated has four adjustable shelves, three-point locking mechanism.



BERGER FLEXI-BILT UNITS (right) Invaluable for storing and protecting hundreds of small items, yet keeping them instantly available. They are individual steel units with indexed, easily adjustable small bins of varying sizes. Many bin combinations are possible, tailored to fit your every need. Write for detailed information.



BERGER STEEL SHELVING (right) Offered in many combinations to fit any storage problem. Complete information on request.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 1334 Madison Avenue, Aurora, Ill.

Factories: AURORA, ILL., YORK, PA.,

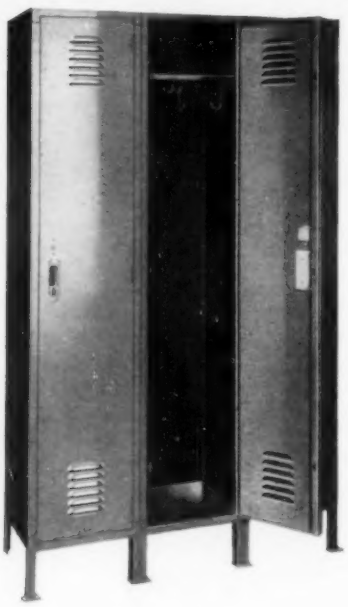
Sold Nationally through Factory Branches and Dealers

LYON STEEL EQUIPMENT



MULTIPLE TIER LOCKERS

Most popular of all multiple tier lockers. This locker is ideal for most small storage requirements. Available in 5 high in the following sizes: 12x12x12—12x15x12, and 15x15x12; 6 high—12x12x12 and 12x15x12; 4 high—15x15x15 (per locker door opening). Green or non-glare gray finish.



SINGLE TIER LOCKERS

Most practical and widely used of all lockers. Recessed handles. Full length clothing storage. Shelf at top for hats, lunches, etc. Available in fourteen sizes from 9" x 12" x 60" to 18" x 21" x 72" (per locker door opening.) Green or non-glare gray finish.

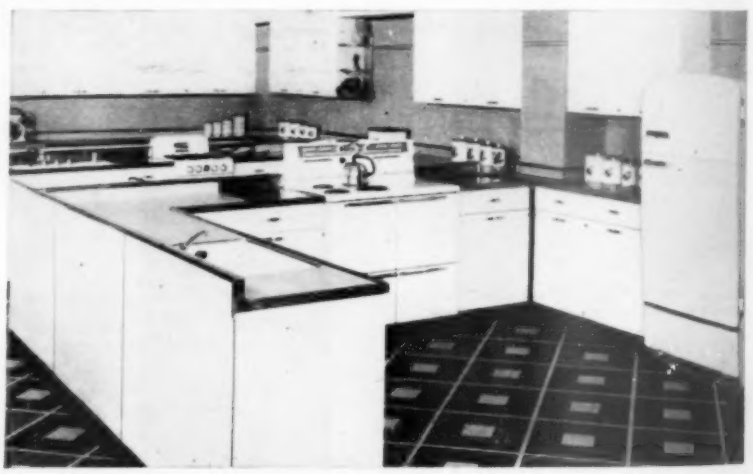


DOUBLE TIER LOCKERS

Economy in cost and space. Excellent for short period occupancy or where long coats are not worn. Available in sizes from 12" x 12" x 30" to 15" x 15" x 36" (per locker door opening). Green or non-glare gray finish.

KITCHEN CABINETS AND SINK UNITS

Beautiful steel kitchen cabinets and sinks are ideal for home economics classes and cafeteria kitchens. White baked-on enamel finish is easy to keep clean. Lyon kitchens are flexible enough to allow a "tailored fit" to any working arrangement desired. Tap-O-Matic handles—tap the handle and the door opens. Insulated for silent operation.



(Specifications subject to change without notice)

LYON METAL PRODUCTS, INCORPORATED

LYON STEEL EQUIPMENT



DRAWING TABLES



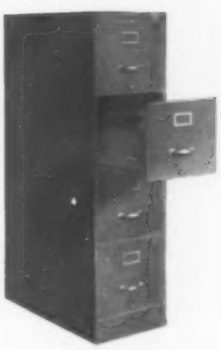
FLAT DRAWER FILES



WOODWORKING BENCHES



STORAGE CABINETS



FILING CABINETS



SERVICE CART



STEEL SHELVING



STEEL STOOLS



WORK BENCHES



FOLDING CHAIRS

A PARTIAL LIST OF LYON PRODUCTS

• Shelving	• Kitchen Cabinets	• Bin Units	• Economy Locker Racks	• Display Equipment	• Filing Cabinets	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Revolving Bins	• Work Benches	• Drawer Units	• Tool Trays
• Tables	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

FRED MEDART PRODUCTS, INC.

3550 DeKalb St. St. Louis 18, Missouri

SALES ENGINEERS IN ALL PRINCIPAL CITIES



MEDART STEEL LOCKERS

WITH A NEW TYPE LOCKING MECHANISM

• Positive Locking • Pre-Latching • Fool-Proof

The *ONLY* locker with *ALL* the practical features considered essential for maximum protection, longer service life and lasting new-like appearance

- Extra strong die-formed steel channel frame, welded into a permanently true and rigid unit.
- Patented "pick-proof" 3-point positive locking mechanism, rubber-cushioned, concealed in door frame.
- Rugged 5-knuckle steel non-sag hinges, welded and bolted to door and frame.
- Strong channel legs integral with frame.
- Baked enamel finish will not flake even under rigid hammer test. Standard colors: Desert Sand, Olive Green, and Gray.
- Available in all standard sizes and interior fittings. Extra shelves, sloping tops, special finishes are extra.

Write for Catalog

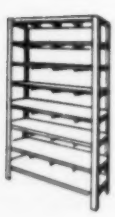
SINGLE TIER LOCKERS

60" x 72" Height

9" Wide x 12" Deep
12" Wide x 12" Deep
12" Wide x 15" Deep
12" Wide x 18" Deep
15" Wide x 15" Deep
15" Wide x 18" Deep

72" Height Only

18" Wide x 18" Deep
18" Wide x 21" Deep



WIRE BASKET SHELVING

The finest permanent and portable Wire Basket Shelving is made by Medart in sizes for every need.



DOUBLE TIER LOCKERS

30" Height

12" Wide x 12" Deep

36" Height

12" Wide x 12" Deep
12" Wide x 15" Deep
12" Wide x 18" Deep
15" Wide x 15" Deep

42" Height

12" Wide x 12" Deep
12" Wide x 15" Deep
15" Wide x 15" Deep



GYM SUIT LOCKERS

4 Tiers High

9" Wide x 12" Deep x 18" High

3 Tiers High

9" Wide x 12" Deep x 20" High
9" Wide x 12" Deep x 24" High
12" Wide x 12" Deep x 24" High



BOX LOCKERS

4 Tiers High

15" Wide x 15" Deep x 15" High

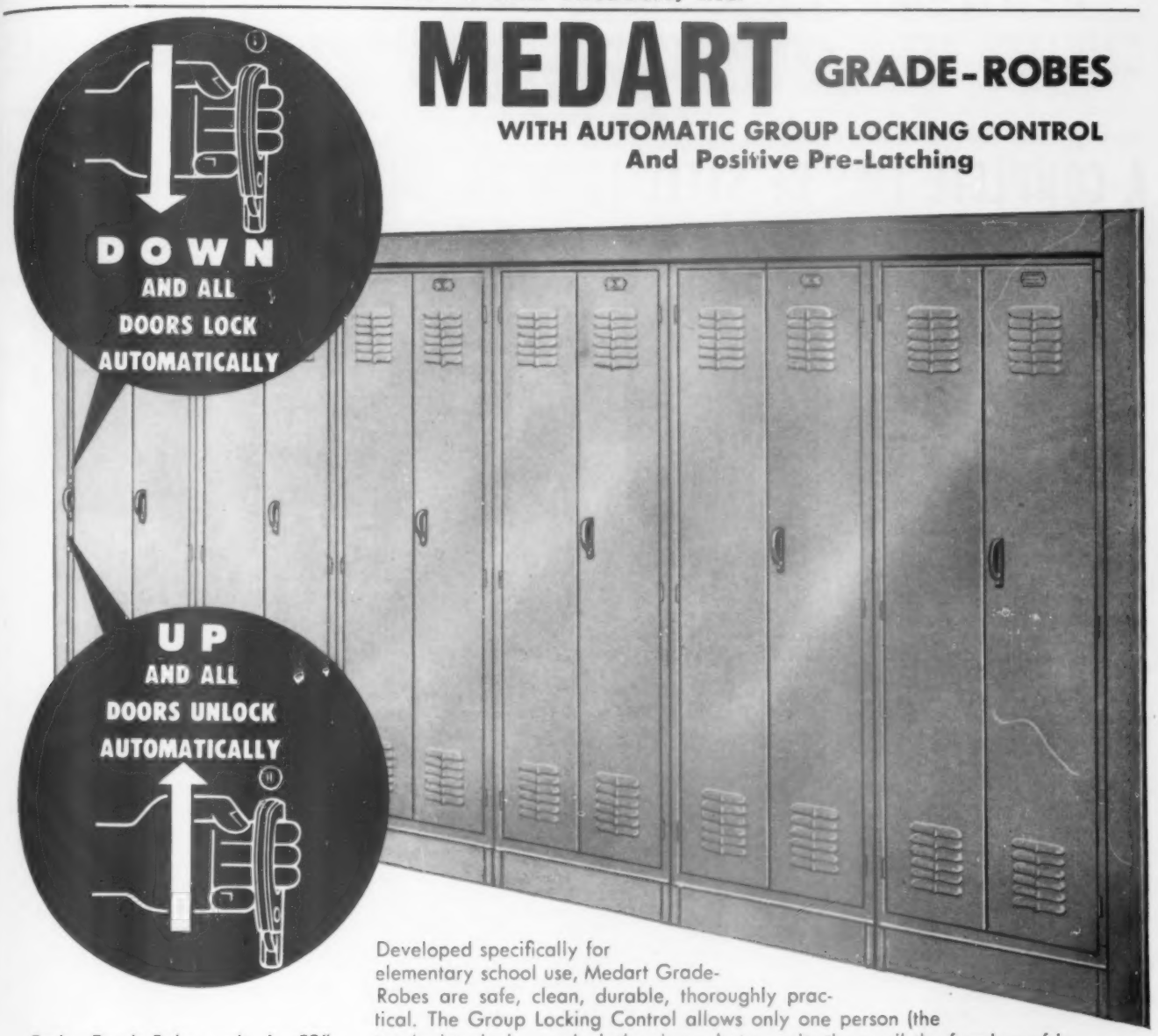
5 & 6 Tiers High

12" Wide x 12" Deep x 12" High
12" Wide x 15" Deep x 12" High
15" Wide x 15" Deep x 12" High

FRED MEDART PRODUCTS, INC.

MEDART GRADE-ROBES

WITH AUTOMATIC GROUP LOCKING CONTROL
And Positive Pre-Latching



Developed specifically for elementary school use, Medart Grade-Robes are safe, clean, durable, thoroughly practical. The Group Locking Control allows only one person (the teacher) to lock or unlock the doors, but permits the pupil the freedom of individual door operation when unlocked. When Master Control is locked, individual doors can be closed and will lock automatically, because of positive 3-point pre-latching, but cannot be opened.

Each Grade-Robe unit is 22" wide, 15" deep, 60" high. Rugged die-formed steel construction, amply ventilated. Various interior arrangements of pupil and auxiliary units are available. Standard finishes: Gray, Desert Sand and Olive Green. Grade-Robes are furnished for free-standing installation, or without legs for pre-built bases.

Grade-Robes can be installed in 16" deep unfinished recesses to eliminate the space wasted by ordinary wardrobes or separate cloakrooms, and thus reduce cubic footage of school buildings and save considerable cost. No finished walls, flooring, or overhead framing are required.

Write for Catalog

MEDART LOCKEROBES
WITH SIMULTANEOUS OPENING MASTER DOOR CONTROL

Lockerobes are similar in construction and size to Grade-Robes, except that one person not only controls the locking and unlocking of all doors, but also opens and closes all doors simultaneously. When the right-hand master control door is opened, all right-hand doors open; when left-hand master control door is opened, all left-hand doors open. Closing of doors is also done simultaneously by operation of master control doors. Door handles and lock are required only on master control door.

PENN METAL CORPORATION OF PENNA.

48 Oregon Avenue, Philadelphia 48, Pa.

86TH YEAR **penco** OF SERVICE

A COMPLETE LINE OF STEEL LOCKERS, SHELVING and CABINETS

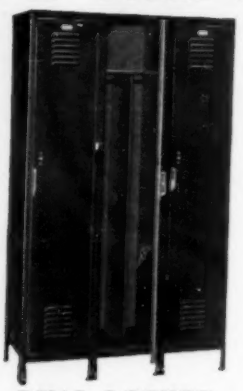


SINGLE TIER LOCKER TYPE 50

The most popular of all personal lockers. Holds complete clothing change, hanging full length. Has hat shelf and coat hooks.

STANDARD SIZES

Width	Depth	Trade Height *
12″	12″	60 or 72″
12″	15″	60 or 72″
12″	18″	60 or 72″
15″	15″	60 or 72″
15″	18″	60 or 72″
18″	18″	60 or 72″
18″	21″	72″
24″	21″	72″
24″	24″	72″



DUAL LOCKER TYPE 91

Same as the Type 50 with addition of a center partition to separate soiled from clean clothing, for one occupant—or for 2-person occupancy. Coat rod in each compartment.

STANDARD SIZES

Width	Depth	Trade Height *
15″	18″	60 or 72″
18″	18″	60 or 72″
18″	21″	72″
24″	21″	72″



DOUBLE TIER LOCKER UNIT—TYPE 50

Each unit accommodates 2 persons, in private lockers with coat hooks, and individual doors. (3 units shown.)

STANDARD SIZES

Width	Depth	Trade ** Height
12″	12″	36 or 42″
12″	15″	36 or 42″
12″	18″	36 or 42″
15″	15″	36 or 42″
15″	18″	36 or 42″

Triple Tier Locker Units also available in variety of sizes, for gym use.



BOX LOCKER UNIT TYPE 40

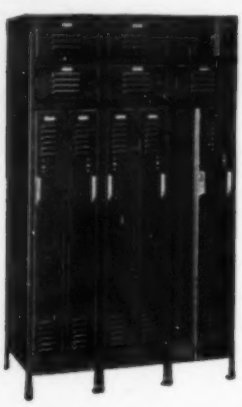
Can be arranged 3, 4, 5, or 6 lockers high and any number of units wide. May be combined with other lockers. (3 units shown.)

STANDARD SIZES

Width	Depth	Trade ** Height
12″	12″	12″
12″	15″	12″
12″	12″	15″
12″	15″	15″
15″	15″	12″
15″	15″	15″
15″	18″	15″
15″	15″	18″
15″	18″	18″

* For overall outside height, add 6″ for legs. Add 1 9/16″ for lockers without legs. Slope tops increase height by half of locker depth.

** Trade height is single locker. For overall outside height, add 6″ to total height of all lockers, for legs. Add 1 9/16″ for units without legs. Slope tops increase height by half of locker depth.



TWO-PERSON LOCKER UNIT—TYPE 734

(Group of 3 Units shown)

Each unit provides private storage for 2 persons in half the usual space. Individual, interlocking hat lockers and full-length coat lockers. Each unit is 15″ wide, 21″ deep, 72″ trade height. Details on request.

PENCO LOCKERS FOR EVERY EDUCATIONAL NEED

These and other steel lockers in the wide Penco line are quality-built to meet or surpass U. S. Federal Specifications, as well as the most stringent architectural requirements for today's modern educational structures. The standard types and sizes shown can be combined in various arrangements for the needs of individual schools and colleges—in corridor, gymnasium and central locker room installations.

Penco's new electrostatically-applied, rust-resistant baked enamel finish is unsurpassed for appearance and durability. Available in standard green or harmonious tan and gray colors. Variety of locking arrangements available, featuring Penco automatic locking.

HOW TO SPECIFY STEEL LOCKERS

Lockers can be provided with or without legs, open or closed bases, flat or sloping tops, singly or in groups. When installed they can be free-standing on the floor, on cement, tile or other bases, or recessed in walls. (Recessing details on request.) Specify which of the foregoing optional features are desired; also quantity, type, size, grouping, numbering scheme, color, type of lock, and whether to ship assembled or knocked down. If possible, furnish floor plan and elevation.

Locker Room Benches with cast iron pedestals also available. Details on request.

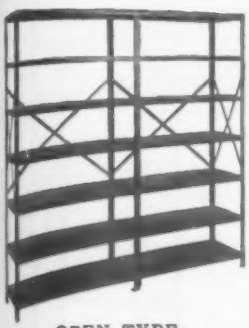


AIR-LITE LOCKERS

Penco's special expanded metal open mesh construction provides maximum natural ventilation, keeps clothes fresher, drier—reduces odors. All the above standard lockers are also available in two Air-Lite styles:
1. With mesh doors, solid sides and backs (as above).
2. With mesh doors, sides and backs (photo at right).

PENN METAL CORPORATION OF PENNA.

SAVE MONEY BY SPECIFYING PENCO STANDARD STEEL SHELVING



OPEN TYPE
PLAIN SHELVING



OPEN TYPE
LEDGE SHELVING

School planners are saving as much as 30%, and more, on original classroom equipment costs, by installing *standard* Penco Shelving for textbook, notebook, supplies, and visual aids storage. The wide range of styles (all meeting U. S. Federal Specs.), and the 735 stock sizes permit great design flexibility.

The basic, standard styles of Penco shelving are shown here. By combining different types and sizes in various quantities, you can meet every storage need. In specifying, state type desired, number of units, size of each unit, and give floor plan and elevation to show arrangements. Additional parts may be added to basic units to provide extra utility. A screwdriver and wrench are the only assembly tools needed. Specify whether extra shelves are wanted, doors, dividers, bin fronts, boxes, or label holders. If unusually heavy loads are to be carried, also advise approximate weight. Standard finish is baked green enamel. Tan and gray also available.



CLOSED TYPE
PLAIN SHELVING



CLOSED TYPE
LEDGE SHELVING

(ALSO AVAILABLE WITH DOORS AND LOCKS)

STANDARD SIZES—PLAIN SHELVING
(any combination of width, depth, height)

Widths	Depths	Heights
24″, 30″, 36″, 42″ 48″	12″, 15″ 18″, 24″ 30″, 36″	3′ 3″ to 10′ 3″ in multiples of 12″

STANDARD SIZES—LEDGE SHELVING
(any combination of width, depth, height)

Widths	Depths		Heights Overall
	Above	Below	
24″, 30″, 36″, 42″, 48″	9″, 12″, 15″, 18″, 24″	15″, 18″, 24″, 30″, 36″	4′ 3″ to 8′ 3″ in multiples of 12″ Ledge height 3′ 3″

PENCO STORAGE AND WARDROBE CABINETS



Eight types available for office wardrobes and supplies storage. Single and double door, four basic sizes—24 x 18 x 78″, 24 x 24 x 78″, 36 x 18 x 78″, 36 x 24 x 78″. Also desk-high, counter-high and tool cabinets—all meeting U. S. Federal Specs. For office and teachers' room use. Can be free-standing or recessed in walls.



MODERN CLASSROOM WITH RECESSED PENCO SHELVING



AIR-LITE LOCKERS in college field house. Expanded steel, all-mesh construction provides better ventilation, greater sanitation than louvered or punched doors. Also permits visual inspection.



PENCO FORCED AIR FLOW LOCKER

Keeps Clothes Fresher, Drier

"BREATHES" AWAY ODORS—AIDS BETTER HEALTH

This built-in, scientifically-ventilated locker sets a new high standard for sanitation, comfort and convenience in schools. Adaptable to the most modern locker room designs and ventilating systems. Complete details and design ideas on request.

SEND FOR BOOKLET No. SE-31

THE INTERIOR STEEL EQUIPMENT CO.

2351 East 69th Street, Cleveland 4, Ohio



LOCKERS

A COMPLETE LINE

- Steel Lockers
- Book Cases
- Shelving
- Filing Cabinets
- Storage Cabinets
- Drafting Tables
- Key Cabinets
- Herbarium Cases
- Work Benches
- Transfer Cases
- Wire Baskets
- Steel Specialties

Interior Steel LOCKERS can be had in a variety of styles and sizes. They are made in accordance with Federal specifications No. AA-L-486. Our catalog will give you the complete line which will meet your needs.

Interior Steel SHELVING and BASKET RACKS are built up from simple standard, quickly assembled parts, and it is possible to obtain hundreds of different combinations of unit styles and sizes, so as to meet your requirements. Write for our catalog.

Interior Steel HERBARIUM CASES offer complete protection for safe storage of specimens from the destructive influence of vermin, dust and air. These cases have been used in many leading museums and universities.

Interior Steel 1100 Line STORAGE CABINET. A complete line which would be an asset to any room or office, available in a variety of sizes and styles. Write for your catalog.

Interior Steel LIBRARY UNITS put to work every inch of storage space with one inch adjustment of shelves. This makes easy and quick rearrangement to meet your current needs.

Interior Steel DRAFTING TABLES. Can be used for a variety of drawing classes. The table has a smooth steel top with an adjustable hinged section, flanged at bottom to hold drafting board. Individual locked drawers for six students.

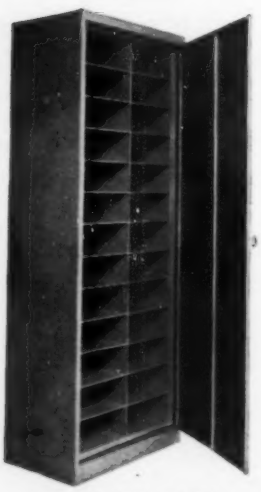
Interior Steel PLAN FILES are designed for use in industrial art and mechanical shops of vocational schools. They can be had in a variety of sizes and either three or five drawer units. Cases are electro-welded which gives you sturdy construction. For further information write for our catalog.



SHELVING AND BASKET RACKS



STORAGE CABINETS



HERBARIUM CASES



LIBRARY INSTALLATIONS



PLAN FILES



DRAFTING TABLE

—FOR STEEL EQUIPMENT SEE *"Interior Steel"* —

CATALOGS ARE AVAILABLE UPON REQUEST

STAR STEEL EQUIPMENT CO., INC.

Dept. B-1, 117-20 Fourteenth Road, College Point 56, L.I., N.Y.

QUICK RELIEF FOR *STORAGE HEADACHES*

All STAR STEEL Equipment is constructed of rugged, extra-heavy gauge steel, with olive-green enamel finish baked on for long life and handsome appearance! All cabinets have special 3-way locking mechanism and are equipped with Chrome Handles and Yale Locks and Keys. (2-door Cabinets have 2 Chrome Handles). Extra shelves available on all cabinets. STAR STEEL Equipment is quick and easy to assemble, with bolts, nuts and other assembly fittings supplied. Simple instruction sheets are enclosed in each carton.

COMBINATION CABINET

Designed for wardrobe and storage duty in offices, factories, homes. One full shelf, 3 adjustable half shelves, generous space for clothes. 72" x 36" x 18".

Style 3CW





Style 1WA

WARDROBE CABINET

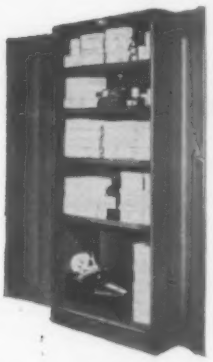
Fifteen to twenty garments will hang in this impressive steel wardrobe. Measures 72" x 36" x 18". Shelf for hats, 2 wide-opening doors.

Also available in 24" depth.

STORAGE CABINET

72" x 36" x 18", has 4 adjustable shelves. An efficient automatic housekeeper for office stationery, forms, equipment. Extra shelves available.

Style 4ST





Style 1DC

DESK HIGH CABINET

The answer for overcrowded desks. Lots of storage space inside, working space on top. 29" x 20" x 18", one shelf.

COUNTER HIGH CABINET

Two adjustable shelves in this low-priced 42" x 36" x 18" or 24" steel cabinet. Counter surface more than 4 sq. ft. *Style 2CH*





STEEL SHELVING

Made to Your Specifications

Star Steel shelving is made in every conceivable type of shelving. Let us know your requirements.

STEEL LOCKERS

ALL SIZES

Double tier and Multiple tier also available. Single tier in single units or 2 or more wide. Padlock attachment or built-in lock.



COUNTER DISPLAY

48" x 33" x 24". Sliding doors and recessed base. There's 9 feet of display space on the top of this cabinet with plenty of room for merchandise on the inside of the sliding doors.



DISPLAY CABINET

Both measure 72" x 36" x 18". Have ¼" plate glass sliding doors. Style FGW (left) makes a perfect display cabinet. Style HGW (right) can be used for display and storage.



Slim Jim UTILITY CABINET

Wardrobe Style 24WA; Storage Style 24ST

Ideal for narrow spaces, measures 72" x 24" x 18" or 24". There's 10 feet of shelf space in 24ST, or plenty of room for clothes in 24WA. Both styles easily interchangeable.



PARTS BINS

To Your Specifications AT NO EXTRA COST

Fill your requirements EXACTLY! Basic Units are 87" x 36" x 12". When your needs change, your bins change. Shelves, sloping dividers, square dividers, bin fronts, drawers, all interchangeable. Additional units always available at low cost. Let us know your needs.



Style 18SP

SMALL PARTS CABINETS

13" x 36" x 12" with 18 generous drawers. Every drawer and drawer-divider (2 to a drawer) has its own individual label holder. Ideal for small parts needed close at hand!

These Storage Helps are JOB-TESTED!

Your guarantee of satisfactory service is JOB-TESTING. Job-tested equipment is sold on one basis alone: the equipment must deliver as required, or it won't be recommended. All storage helps illustrated here are job-tested. We take pride in offering and recommending this money-saving, space-saving, work-saving equipment.

Write Dept. B-1 for Catalogue

DUDLEY LOCK CORPORATION

Dept. 244, Crystal Lake, Illinois

(Suburb of Chicago)

Dudley Locks have set a standard of school protection for over 30 years. Dudley's pioneering in systematic locker control has developed an easy, safe method of locker administration.

Dudley Locks are guaranteed for two years against defects in materials or workmanship. For long, trouble-free service, dependable economical protection, specify Dudley Locks, schoolwide.

The Dudley representative near you is a specialist in school locker operation. He will be glad to help you work out the answer to your school's locker problems. There's no cost or obligation for this service. Just write to us, outlining your problem.

Master-Charted Combination Locks



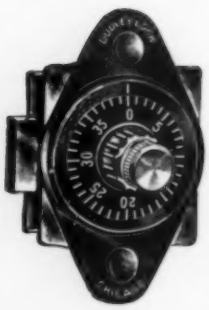
RD-2 Rotodial

Rotating dial combination padlock with dependable 3-tumbler mechanism in stainless steel case. Self-locking. When shackle is pushed home, all three tumblers spin and last combination number is whirled out of sight. Ruggedly built for years of service.



RP-5 Rotopoint

Reliable, knob-pointer padlock, economically priced. Case is solid brass. Sturdy, 3-tumbler mechanism is rust-resistant. Forty-division dial, 64,000 possible combinations. Self-locking when hasp is pushed home, requiring complete redialing to open.

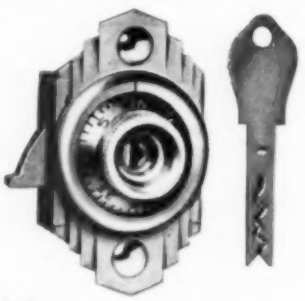


L-4

Built-in combination lock. Has square dead bolt for lockers without automatic latch release. Forty-division dial, 64,000 possible combinations. Dial finished in black enamel with numerals and division marks in white. Combination readily changed.

Master-Keyed Combination and Key Locks

Dudley Master-Keyed Locks are built with the unique Bell-type pin tumbler cylinder, exceptionally pick-resistant. The famous exclusive Bell Key cannot be duplicated on commercial keymaking machines. Duplicate Master Keys are supplied by Dudley only after absolute proof of authority. All these Master-Keyed Dudley Locks illustrated below can be supplied with the same Master Key. To keep complete locker control in your hands, the Dudley Master Chart is furnished with every schoolwide installation. The lock numbers are recorded in sequence with corresponding combinations. An authorized person can quickly open any locker in the school.



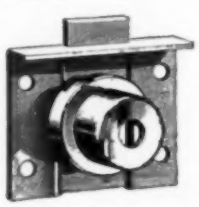
S-540

Change the combination of this built-in Master-Keyed Lock in only 15 seconds. All you have to do is insert the special Dudley reset key and dial the new combination. For lockers with automatic latch release. Self-locking. Fits all locker piercings, is available for right or left hand doors.



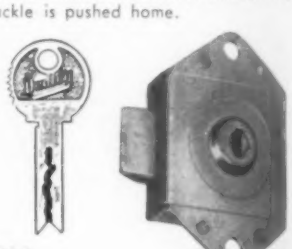
P-570

The finest Master-Keyed Padlock made in America. Case is satin finish, cast aluminum with extra-heavy steel shackle. Rotating dial with numerals and divisions accented in black. Forty divisions, 64,000 possible combinations. Self-locking. Dial spins off last combination number when shackle is pushed home.



W-510

Key lock for wood drawers and cabinets $\frac{7}{8}$" thick. Keyed individually or alike. Can be Master-Keyed alone or in same series with other Dudley Master-Keyed Locks.



S-535

Key lock for lockers and steel cabinets, with bevel spring bolt. Keyed individually or alike. Can be Master-Keyed alone or in same series with other Dudley Master-Keyed Locks.

MASTER LOCK COMPANY

Milwaukee 45, Wisconsin

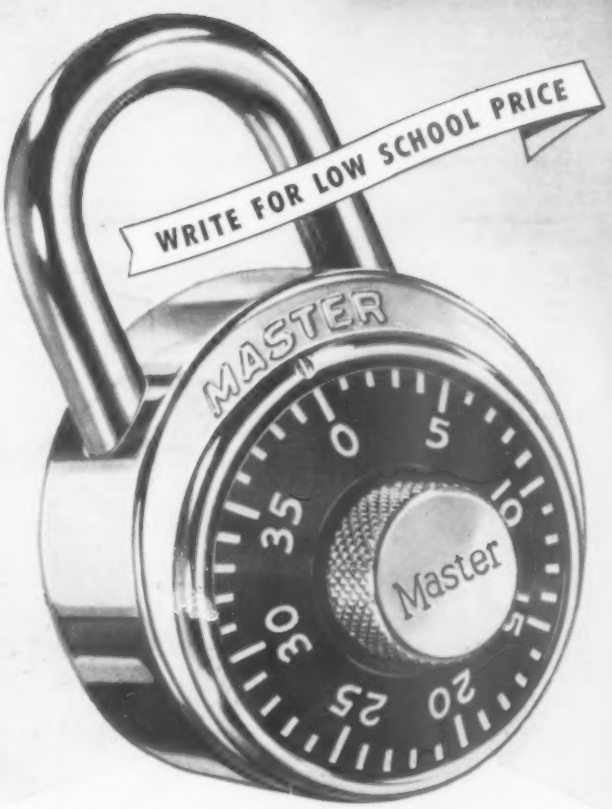
NOW! the strength of STAINLESS STEEL is added to MASTER protection

Double case construction . . . stainless steel over heavy wrought steel.

Built in sound effect . . . prevents picking.

Solid brass diamond-knurled knob . . . nickel plated.

Specially constructed keyway and key. Duplicate keys for No. 1525 available only to authorized school officials.



Nickel-plated alloy steel shackle.

Hardened steel locking latch.

No delicate springs — works on direct action principle.

Self-locking. Tumblers disarrange automatically.

Time-tested superiority. Proved by thousands of school installations.

2 year guarantee on materials and workmanship.

2 Popular Models

Write for Free Brochure



NO. 1500

Long time school favorite. Rugged, dependable. 3 number dialing. Precision built for long life, trouble-free service.



NO. 1525

Key Controlled

Each student has own combination — yet one school-owned control key opens every locker.

Master Lock Company, Milwaukee 45, Wis. . . . . *World's Leading Padlock Manufacturers*

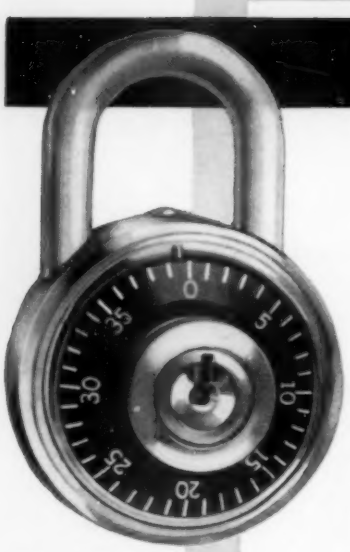
NATIONAL LOCK COMPANY

Rockford, Illinois

ROCKFORD Combination LOCKS

dependable guardians of school lockers for 25 years

For complete locker protection at low cost . . . for simplified locker administration . . . choose ROCKFORD Combination Locker Locks. Soundly-engineered for use on all styles of standard locker equipment, these quality locks assure the utmost in security, convenience, simplicity and durability. For trouble-free performance, select ROCKFORD Locks.



No. 68-264

no. 68-264

A high-quality, dependable combination shackle lock with Stainless Steel outer case. Dial is black enamel with white gradations. Lock has 5/16" dia. heavy-duty Chromium plated shackle. Requires three-number dialing to open. Thousands of different dialing combinations. Masterkeyed so it can be opened by authorized custodian.

no. 68-265

This outstanding shackle lock has many of the same excellent features as found in the No. 68-264. Shackle is 5/16" diameter. Lock must be dialed to three numbers to open. Dial is locked against rotation when shackle is open. This lock is not masterkeyed. Provided in plain zinc or bright Chromium finish. A dependable performer.

no. 68-267

The working parts of this built-in lock have been completely redesigned to provide added strength and long trouble-free protection. For use on lockers with spring latch bar. Closing door drops latch and automatically locks lock. Escutcheon is satin Chromium plated. Master key is included with each initial order of 12 or more locks.



No. 68-265

no. 68-268

This durable, redesigned lock has the same outstanding characteristics as the No. 68-267, except it is not masterkeyed. May be applied to many lockers now in use. Ideal for either right or left hand applications. Self-locking. On new lockers you buy, it will prove your assurance of long-term security.

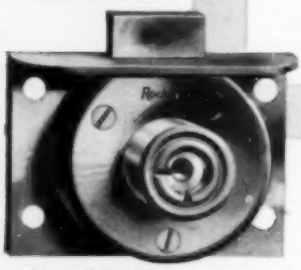
no. 68-253

This lock is designed for use on Vocational and Laboratory Furniture. It is of heavy solid Brass construction to withstand hard usage and acid fumes. It is available with masterkey or submaster key features, if desired. Half mortise application for either right or left hand doors or for drawers. A quality lock.

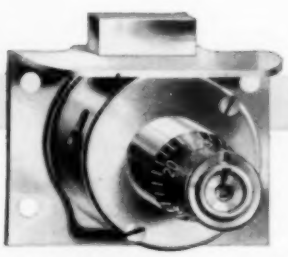
no. 68-259

Combination masterkeyed Laboratory Drawer or Door Lock. Combination can quickly be changed without removing lock from mortise. Lock is of solid Brass construction and is not affected by ordinary laboratory fumes and acids. This quality Rockford lock is reversible for use on right or left hand doors.

ask for illustrated folder showing complete line



No. 68-253



No. 68-259



No. 68-267



No. 68-268

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G PHYSICAL EDUCATION—HEALTH

a. Bleachers & Grandstands

American Bridge Div., United States Steel Corp.	G 3
Castadia, Inc.	G 4
Hussey Mfg. Co., Inc.	G 5
Fred Medart Products, Inc.	G 6, 7
Long Island Bleacher Co., Inc.	G 8
Pittsburgh-Des Moines Steel Company	G 9
Playtime Equipment Corp.	G 10
Safway Steel Products, Inc.	G 11
Snyder Tank Corp.	G 12
Universal Bleacher Company	G 13
Wayne Iron Works	G 14, 15

b. Athletic Equipment

M. D. Brown Company	G 16
All-American Scoreboard Corporation	G 17
Fair Play Mfg. Co.	G 18
Naden & Sons Electric Scoreboard Company	G 19
Crouse-Hinds Company	G 20
General Electric Company, Apparatus Sales Div.	G 21

c. Playground Equipment

American Playground Device Co.	G 22, 23
General Playground Equipment Inc.	G 24
Recreation Equipment Corp.	G 25

d. Swimming Pool Equipment

Mathieson Chemical Corporation	G 26
Wallace & Tiernan	G 27

e. Waste Receptacles

The Bennett Manufacturing Company	G 28
United Metal Box Company	G 29
Solar-Sturges Manufacturing Div., Pressed Steel Car Co., Inc.	G 30

AMERICAN BRIDGE

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION

General Offices: 525 William Penn Place, Pittsburgh, Pa.

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UNITED STATES STEEL

MODERN STEEL-DECK STADIUM AND GRANDSTAND CONSTRUCTION

for More Seats — Better Seats — Lower Costs

AMERICAN BRIDGE modern Steel-Deck Stadiums and Grandstands are the product of nearly thirty years of technical and practical experience in this specialized field of construction. Actual experience, including many of the largest Steel-Deck stadiums in the country, has proved its extreme adaptability for municipal, college and high school seating facilities. A few of its many advantages over other types of permanent construction are:



SECTIONAL VIEW of upper and lower steel decks of Tulane (Sugar Bowl) stadium, New Orleans.

1. More economical to build than other permanent types of construction.
2. Low upkeep—No maintenance required except an occasional coat of paint.
3. Easily adapted to any local requirement as to size, design—and to ground contour without extensive grading.
4. Easy to extend by adding standard sections at ends, or by double-decking with welded watertight steel plates.
5. Steel decks welded watertight form a perfect roof for room facilities beneath the stadium for lockers, showers, classrooms, concession booths, etc.
6. Can be double-decked with minimum interference by supporting columns, when ground space is not available for horizontal extension.
7. Simplicity of fabrication, ease and speed of erection assures quick completion.
8. Combines the inherent qualities of steel for strength, safety and durability.
9. Scientifically plotted and designed for maximum spectator comfort and convenience, and economy to owner.

Our engineers are at your service for free consultation on your stadium or grandstand problem. Cost estimates furnished without obligation for definite projects.

For more complete information write for our booklet "Steel-Deck Stadium Construction."



WOODLAWN HIGH SCHOOL stadium, Birmingham, Ala., providing building facilities beneath the watertight steel deck.

CASTADIA INC.
2242 N. 35th St., Milwaukee, Wisconsin

NOW any School or Community Can Have a Beautiful Permanent CONCRETE STADIUM with CASTADIA

Yes, by use of pre-cast sections of concrete, a stadium to fit your particular needs can be built at remarkable savings in time, cost, and upkeep over the years.

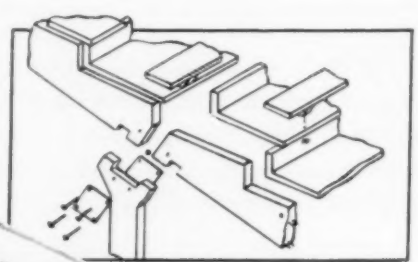
Check These 8 BIG Advantages

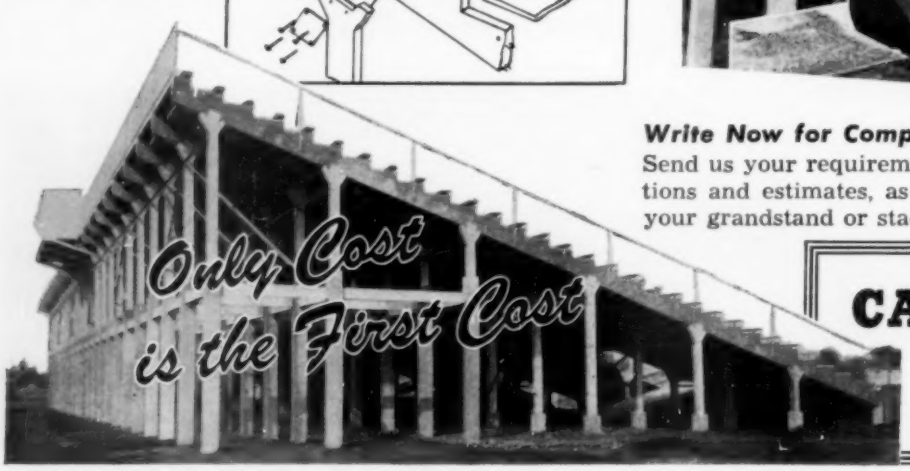
1. **LOW CONSTRUCTION COST** — "Castadia" cost approximately half the amount for monolithic construction and are priced competitively with permanent steel stands.
2. **LOW MAINTENANCE COST** — Made of durable concrete and requiring no painting, "Castadia" need practically no maintenance.
3. **QUICKLY CONSTRUCTED** — "Castadia" go up in less time than other permanent seating structures.
4. **EXTRA FACILITIES**—"Castadia" may be enclosed underneath for showers, dressing rooms, concessions, restrooms or storage.
5. **FIREPROOF** — and of proven structurally safe design.
6. **FLEXIBLE**—"Castadia" can be expanded by increasing height or length to adjust to larger future needs.
7. **WARMER AND MORE COMFORTABLE** — 30 inch treads allow ample leg room — and there are no cold drafts blowing through the stands.
8. **CLEANLINESS** — Waste trash can't fall through and collect under the stadium.





Exploded view of Castadia Construction



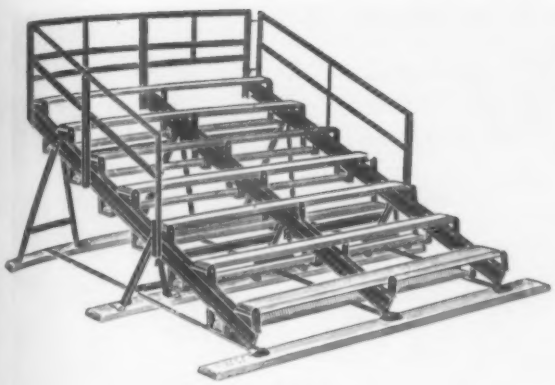


Write Now for Complete Information on "CASTADIA"
Send us your requirements and we will make recommendations and estimates, as well as furnish layout planning for your grandstand or stadium.

CASTADIA INC.
2242 N. 35th St.
MILWAUKEE, WISCONSIN

HUSSEY MFG. CO., INC.

NORTH BERWICK • Ironworkers Since 1835 • MAINE



Model "6" Portable Bleacher Section



Model "8" Portable Grandstand Section



New "Roll-Out" Gym Seat Section

HUSSEY SAFE SEATING

SAFE SEATING FOR EVERY OCCASION

Portable - Permanent - "Roll-Out"

If you have a seating problem, Hussey has the answer. Whether they be for outdoor or indoor use—of portable or permanent construction—you are sure of stands that are safe, durable and, dollar for dollar, give you the most for your money.

Hussey patented, portable steel stands, illustrated at the left, have long been leaders in their field. They can be used both indoors and out—are quick and easy to put up and take down (no skilled help is needed).

Model 6 at upper left is the only *truly* portable Steel Supported Bleachers on the market that can be set up and taken down without the use of tools. Over a million 18" seats now in use.

Model 8 at center left also is a truly portable type of grandstand (foot boards above the stringers). Can also be furnished with elevated front aisles as well as cross aisles. The most economical grandstand of the portable type now obtainable. Write for catalog and specifications.

NEW "ROLL-OUT" GYM SEATS

This newest addition to the Hussey line has many new outstanding features including—fully enclosed deck, one man operation, "no mar" casters, flush front, improved simplified construction, etc. They reduce building costs and make available additional seating without loss of floor space. Write for free illustrated folder and specification sheet.

FREE ENGINEERING SERVICE

Hussey seating engineers are at your service without cost or obligation. Let us help you with your seating problem.

HUSSEY MFG. CO., INC.

5415 Railroad Ave., N. Berwick, Maine

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Water Sports Equipment—Demountable, Adjustable, Steel Landing Piers—Diving Boards, Floats, Rafts and accessories. Also, Flag Poles, Miscellaneous Iron, etc. Write for FREE Literature, Prices and Detailed Information

FRED MEDART PRODUCTS, INC.

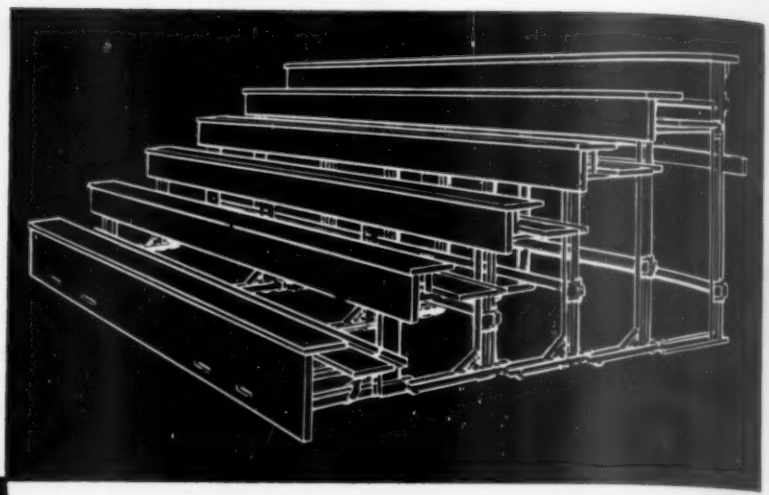
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SALES ENGINEERS IN ALL PRINCIPAL CITIES

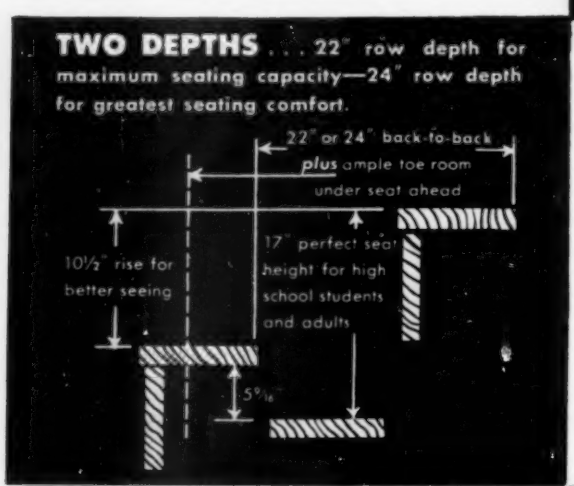
MEDART

NEW

TELESCOPIC GYM SEATS



TWO DEPTHS . . . 22" row depth for maximum seating capacity—24" row depth for greatest seating comfort.



The economy, convenience and revenue-producing value of Medart Telescopic Gym Seats have been proved by completely satisfactory installations in thousands of schools and colleges. In comparison with fixed seating, telescoping seats not only cost much less, but provide equal usable floor space for normal class use in far smaller structures, thus saving substantial sums in building costs.

Medart Telescopic Gym Seats virtually pay for themselves, plus a sizable portion of the athletic program, by accommodating maximum audiences at the least cost, and within a few minutes. Janitor time is less too, because with Medart Seats, clean-up is easy. And Medart Seats are convenient. One or two persons can quickly open and close them with minimum effort.

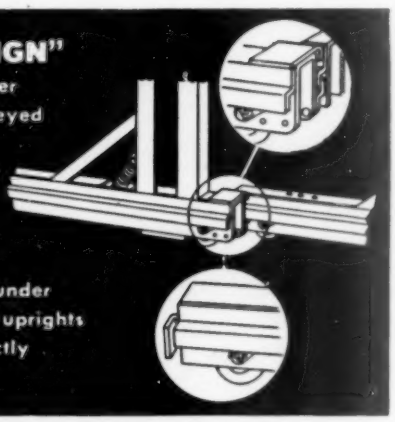
Whether installed in existing or new buildings, against the wall or recessed, or on both balcony and main floor, Medart Seats return the total investment in a short time, and keep paying worthwhile dividends year after year.

NEW DESIGN has achieved weight reduction up to 70 pounds per row—the easiest gym seat to open and close.

SELF-SUPPORTING understructure now stronger than ever—wood parts give *additional* strength.

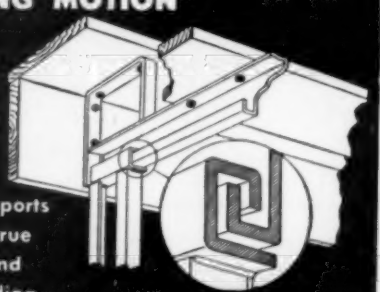
4 VERTICAL UPRIGHTS support each row—controlled weight distribution—no extra wall reinforcing required.

"DUAL-ALIGN" cushioned roller housing are keyed together and interlocked for straight-line trackage. Non-marring rollers retract under load—vertical uprights then bear directly on floor.



Write For Catalog

"FLOATING MOTION" opening and closing assured by interlocking members and multiple supports that insure true alignment and prevent binding.



MOVABLE SEATS Compact, easy-to-handle, readily-stored. Perfect in structures where wall-attached or recessed seats are impractical.

2-LEVEL SEATS Wall-attached or movable type for installation on balcony and main floor provide maximum seating capacity, but "recover" virtually all floor space for normal class use.

RECESSED SEATS Free entire floor area when closed. Recess of adequate depth and height required in new buildings, plus provision for anchoring.

FRED MEDART PRODUCTS, INC.

MEDART BASKETBALL BACKSTOPS



OFFICIAL FAN-SHAPED GLASS
Made of Herculite tempered glass, Neoprene cushioned and permanently mounted in double-angle, welded metal frame. Quickly replaces the Medart fan-shaped official steel backboard. (NOT SHOWN) Medart's Official world-famous fan-shaped steel backboard, built of a single 10-gauge steel shell, channel reinforced.

Medart offers not only a complete line of Basketball Backstops but also the engineering assistance to choose the *RIGHT* Backstop, to assure that it is correctly "tailored-to-the-job" to meet all structural conditions, and to make certain that it is properly erected to give the maximum in rigidity, permanence and freedom from vibration.

Whether of steel, glass or wood, Medart Backboards will not splinter, buckle, wear or distort in any normal climate or atmospheric condition. All are skillfully engineered and fabricated, and rigorously tested to provide the most in durability and strength. And every one conforms to the Official Standards of the National Basketball Committee.

Write for Catalog

OFFICIAL RECTANGULAR GLASS
Made of ⅞" Herculite tempered glass. Sturdy, rigid metal frame. (NOT SHOWN) Medart's ruggedly framed, thick plywood rectangular backboard—a favorite for practice play.



MEDART BASKETBALL SCOREBOARDS



NO. 3500 SELEKTOR® SCORER & TIMER

No other scoreboards made surpass Medart's for easy, simple, rapid operation, superior engineering, quality of materials, expert workmanship, and long trouble-free service. Specially designed numeral blocks for highest visibility. Extra care in design and fabrication assure positive accuracy.

Write for Brochure

12½" x 7" lighted plastic number blocks—Quick reset for periods from 20 to 15 minutes, then down to 1—Automatic Timing shows play time in seconds—Push Button Scoring—Automatic Signalling. 6'6" x 4'2". Reinforced steel. Services from front.

Fast push button reset—27" translucent face lights when timer is on—Dead stop brake for time out—8½" tall numerals, tested for high visibility—Automatic horn sounds end of period—Push button controls for all signals. 6'2" x 3'6". All steel, black wrinkle finish.



NO. 1025 CLOCK-TYPE SCORER & TIMER

MEDART GYMNASIUM APPARATUS







Medart is the largest and most complete source anywhere for gymnasium equipment! Built into every item of apparatus is 78 years of experience in the manufacture of the finest equipment available. Acceptance of Medart by thousands of leading schools, colleges and gymnasiums, by the U.S. Armed Services, Olympic Games and championship meets all over the world is ample testimony of Medart quality and design which meets or exceeds every Official Standard.

Write for Catalog

MEDART'S COMPLETE LINE INCLUDES:

- Side and Vaulting Horses
- Parallel Bars
- Horizontal Bars
- Swivel Flying Rings
- Climbing ropes, poles & ladders
- Pond-Medart Twisting Belt
- Stall Bars
- Resistance Machines
- Mats & Mat Trucks
- Boxing Rings and equipment
- Vault, jumps & game standards
- Rowing Machines
- Pulley Weights
- Physical Therapy equipment
- Anthropometric equipment

—and virtually every other item desired for physical training.

LONG ISLAND BLEACHER CO., INC.

33–35 9th Street, Long Island City 6, N. Y. RAvenswood 8-4467

Designers, Manufacturers and Erectors of Steel Grandstands
Permanent and Portable Bleachers, Telescopic and Jack Knife Gymstands

Start Planning Now with L.I.B.

If you are planning for new bleachers—or additions to existing equipment—discuss your needs with L.I.B.

The engineering staff with more than 30 years of practical experience in the design, manufacture and erection of indoor and outdoor steel seating equipment is ready to put this knowledge to work for you—to help you select the type bleacher best suited to your needs and budget. Our experience ranges from the manufacture and erection of double-deck and large canopied stadiums seating up to 20,000, down to the smallest portable bleacher.

Comfort and Visibility

On all types of L.I.B. Bleachers, both portable and permanent, there is sufficient room between rows to permit free leg room. Footboards are 16 inches wide, providing sufficient walking space, and because the above seat board overhangs, there is no open space for spectators to slip through. All seat boards join flush-at-ends, no uneven bumps or chance of being pinched. A rise of nine inches between seatboards provides ample and unobstructed visibility.

Portable Bleachers Require No Foundations

Being constructed in easily handled sections, with simple construction principles, these bleachers are easily and quickly erected by unskilled labor. They can just as quickly be taken down, and can be compactly stored. Specially designed Angle Bents and Stringers automatically adjust themselves to uneven terrain, and no special foundations are required.

Length and height are easily increased because all sections are standard and inter-changeable, height or length can be increased by adding additional material.

Eight Points To Be Considered When Purchasing A Bleacher

1. Safety; 2. Comfort; 3. Life of Bleacher; 4. Insurance Rate; 5. Re-Sale Value; 6. Assembly and Erection; 7. Adaptability; 8. Appearance. ALL EIGHT of the important features outlined above are found in L.I.B. SAFE STEEL BLEACHERS.

Safety

The sections of all L.I.B. Portable Steel Bleachers are 12-16-18 feet long, and steel supports occur every 4′ 6″. As mentioned previously, the strength of all steel meets rigid specifications. Correct engineering design prohibits side-sway and because all parts interlock, the heavier the spectator load, the greater the compactness of the structure. Every bleacher is constructed to hold four times the given load.

In the many years that L.I.B. bleachers have been in use, there has never been an accident due to faulty construction.

Specifications for Portable Bleachers

Bleachers are designed to support, in addition to their own weight, a live load of 120 pounds per linear foot of seatboards, plus 120 pounds per linear foot of footboards, and to withstand a side sway load of 24 pounds per linear foot of seatboard and a front-to-back sway load of 10 pounds per linear foot of seatboards. Under these loads stresses in steel shall not exceed those specified by the American Institute of Steel Construction, and stresses in wood shall not exceed those specified by the U.S. Forest Products Laboratory, and are so constructed that they will conform to inequalities in the ground without increasing stresses beyond the limits specified, and without jeopardizing the stability of the structure or the safety of its occupants. Seat boards 2″ x 10″, Foot Boards, Two 2″ x 8″, Select Structural Oregon Fir, Kiln Dried.

Stringers—Stringers shall be channel steel, not less than 5-in. channel. Bottom end of stringer shall have bearing plate welded to same for resting on the floor or ground.



JACK KNIFE BLEACHER



11 ROW TELESCOPE GYM BLEACHER



TYPE F



TYPE C

Seat and Foot Board Supports—Supports shall not be less than 2 x 2 x 3/16-in. steel angles, riveted to stringer, forming one complete unit. Tops of angle support shall be slotted to receive lip of locking device.

Seat and Foot Boards—Seat and foot boards, Oregon fir, dressed 4 sides. Each have 4 patented Sta-Tight latches to secure same to steel supports. There are no loose bolts or removable parts to this foolproof lock. Easy to erect and take down. Note latch and slotted angle connection.

Bents—Bents shall consist of two vertical struts of 2½ x 2½ x 3/16-in. angle steel, braced horizontally and diagonally to insure rigidity against side-sway, tops of each strut shall have proper provision for receiving stringers. Bearing plates, 6 x 6 x ¼ in. to be welded to foot of each bent, for resting on floor or ground. Horizontal and diagonal braces to be not less than 2 x 2 x 3/16-in. steel angles, and shall be welded to struts.

More for your money in a Long Island Bleacher.

PITTSBURGH-DES MOINES STEEL COMPANY

Plants at PITTSBURGH, PA.—DES MOINES, IOWA—SANTA CLARA, CALIF.

Sales Offices at

Pittsburgh (25), 3425 Neville Isand • Des Moines (8), 924 Tuttle St. • Newark (2), 294 Industrial Office Bldg. • Dallas (1), 1224 Praetorian Bldg. • Chicago (3), 1215 First National Bank Bldg. • Los Angeles (48), 6399 Wilshire Blvd. • Seattle, 515 Lane Street • Santa Clara, Cal., 614 Alviso Road

STEEL DECK GRANDSTANDS







Serving schools and colleges from coast to coast, Pittsburgh-Des Moines Steel Deck Grandstands offer the maximum values in safety, comfort, permanence and fine appearance. These Grandstands, with their unique system of unitized construction, make possible complete flexibility in design, plus speed and economy in erection. The original installation may be either large or small, since the unitized design includes provisions for adding sections at any time to increase capacity in width, depth or both. Stands may be built along one, two, or three sides of the field, or may completely surround it. Assembly may be by bolting or welding. If assembled by bolts, the stands may be dismantled and re-erected at a new location if desired.

WEATHERTIGHT DECKS

Weathertight steel decks are an important design feature of Pittsburgh-Des Moines Grandstands. Supported by heavy steel under-bracings, they provide a weathertight underdeck space which may be utilized for dressing rooms, toilet facilities, storage space, etc. If desired, the underdeck area may be totally enclosed by the construction of masonry walls along the ends and back of the stands. These Grandstands are furnished complete with guardrails, steps or ramps, and built-in press box, if specified. The wood seat planks are supported by cast iron or welded steel stools which are bolted to the deck. Other types of seating also can be furnished.

SIZE AND SEATING CAPACITY

Pittsburgh-Des Moines Steel Deck Grandstands may be any length, and any number of rows deep. For economy, however, we recommend that the length of the stand be 15 or 15 plus any multiple of 8 (such as 23, 31, 39, etc.).

Seating capacity of a grandstand, with due allowance made for aisle space, may be calculated as follows:

Basis 16½" seat widths $S = R \times L \times 2/3$

Basis 18" seat widths $S = R \times L \times 11/18$

Where S is seating capacity of stand

R is number of rows in stand

L is length of stand in feet.

ECONOMY FEATURES

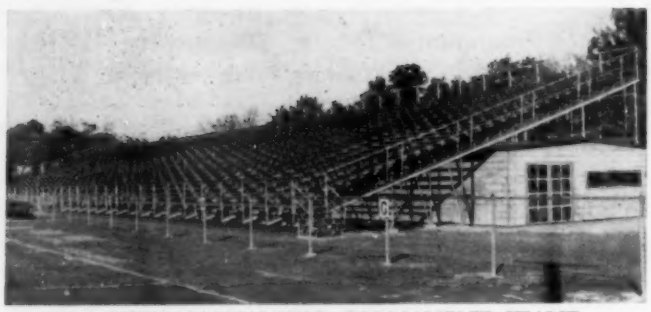
Since they have the permanence of steel, these Grandstands are a lifetime investment. They will not weaken or collapse, for they cannot rot or decay. The initial cost is relatively low, and the salvage factor also is an important consideration. An occasional coat of paint is all the maintenance necessary to keep them new-looking year after year.

Without obligation a Pittsburgh-Des Moines representative will be glad to consult with you on your future plans, and to provide any desired assistance.

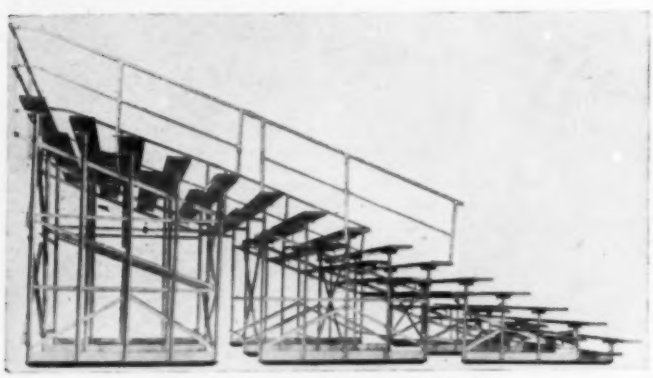
P-DM Steel Deck Grandstands are illustrated and described in detail in a 20-page catalog. May we send you a copy?

PLAYTIME EQUIPMENT CORP.

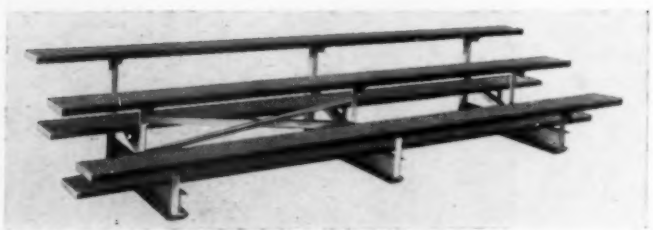
Mars, Pennsylvania



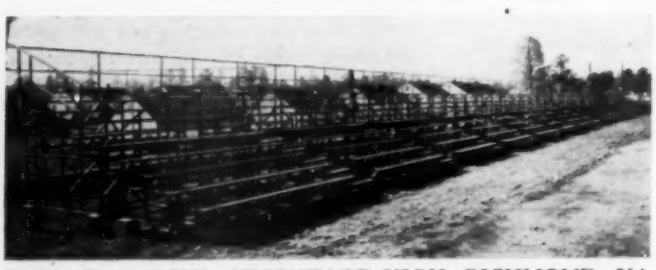
25 ROW GALVANIZED PERMANENT STAND



TYPE RF 15 ROW—PORTABLE



TYPE RF 3 ROW—PORTABLE



TYPE CS 10 ROW—HERMITAGE HIGH, RICHMOND, VA.

Welded Steel PERMANENT Stands and Portable Bleachers by PLAYTIME

FOR OUTDOOR AND INDOOR ACTIVITIES

Playtime Portable Bleachers and the new GALVANIZED Permanent Stand feature the exclusive one piece Welded Steel Panel. This type of construction not only offers a more rigid structure plus increased safety factor, but also provides additional user benefits. Bleacher units can be more quickly assembled, moved without dismantling and easily aligned. Permanent Stands too, are more quickly and economically erected. Due to the unitized design, increasing seating capacity is greatly simplified.

The new Welded Steel Permanent Stand is Hot-Dipped Galvanized after fabrication, down to the last nut and bolt—expensive maintenance painting is eliminated. A "housing" structure for lockers, dressing rooms, storage, etc. is available at NO EXTRA COST on the larger stands. This Rust-Free Permanent Stand is also ideally suited for hillside applications.

Type RF or CS Portable Bleachers are available in 3 to 20 Rows either as Individual Units or as a Continuous Unit. They are also adaptable for use as Elevated Stands and for many other special applications.

CONSTRUCTION FACTS: PERMANENT STAND 6″ Channel Stringer with foot and seatboard supports welded to it. All steel galvanized after fabrication. Seatboards, 2″ x 10″—Footboards, (2) 2″ x 8″. One piece board wide corrugated fasteners. Depth per row 24″—Height from footboard to seatboard 18″. All steel ¼″ thick.

PORTABLE BLEACHERS: Type RF has a 5″ Channel base—Type CS has a heavy Angle base—all Steel Angles ¼″ thick, painted with a heavy coat of Red Lead. Foot and Seatboards, 2″ x 10″ or 2″ x 12″ West Coast Douglas Fir. Galvanized Bolts for fastening foot and seatboards and steel bracing. Treated Oak Skids bolted to Panels.

Write for Specific Recommendations and Quotations.
REPRESENTATIVES IN 38 CITIES

PLAYTIME PORTABLE RISERS



The new Playtime Portable Riser uses the welded Panel principal to provide rugged, easily handled 4′ wide units. Using a special bracket type brace no bolts, latches or clamps are required to assemble Riser Units. Available for standing and seated Choral groups, Orchestras; also Portable Stages.

"its the PANEL that makes the DIFFERENCE"

PLAYTIME EQUIPMENT CORP.
MARS, PENNA.

SAFWAY STEEL PRODUCTS, INC.

6229 W. State St., Milwaukee 13, Wis.

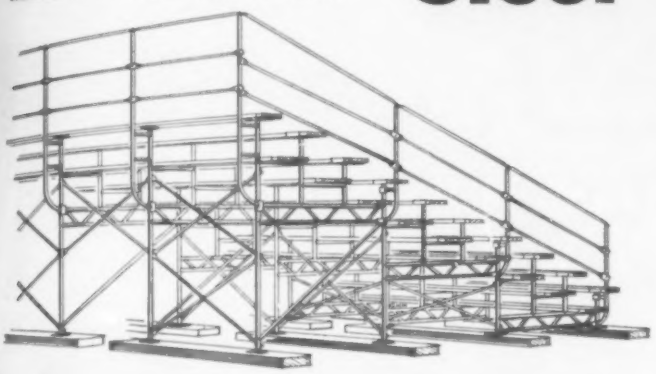
Manufacturers of Tubular Steel Scaffolding, Grandstands, Bleachers and Other Steel Products

DISTRIBUTORS IN PRINCIPAL CITIES

Permanent and Portable

Steel GRANDSTANDS and BLEACHERS ...*Engineered* BY SAFWAY

(Below) Typical Safway Portable Steel Bleacher Section—Each basic unit is 6 ft. wide by 6 ft. deep and provides 3 rows of seats. More sections are added at sides and back to obtain required capacity.





Over 12,200 people watch baseball and football games from these Safway stands located on the East coast. This grandstand-bleacher assembly provides unexcelled play by play visibility. Knee bracing plus horizontal and vertical cross bracing gives uniform, well-distributed strength.

For permanent or temporary seating structures, either outdoors or inside. Stands of any required length, depth or shape may be assembled rapidly from standard Safway parts. Unskilled help can handle this job without special tools. The simple construction of individual members and the complete stand keeps erection costs at a minimum; Safway's *engineered design* provides incomparable safety.

- ***ENGINEERED DESIGN***—Sturdy tubular steel frame members are made with close tolerances to assure rigid joints. Cross braces secured with studs and wing nuts; sections added in height and depth with coupling pins. Simple fasteners hold seat and floor planks securely.
- ***MAXIMUM PORTABILITY***—Erection time minimized by interchangeability and convenient size of Safway parts. Dismantling and storage equally easy; parts may then be re-used in the same *or any other form*. More sections or rows can be added at any time.
- ***MAXIMUM SAFETY***—Rigidity and structural unity of complete stand is assured by Safway design. Heavy loads and sudden crowd strains distributed evenly throughout framework by system of *continuous cross bracing*. No independent towers, A-frames or stringers.
- ***SUPERIOR VISION***—Every seat *a good seat*. Steep pitch of not less than 8½″ rise between seat rows permitted by inherent strength of tubular members and Safway engineered design.

WRITE FOR ESTIMATE

Write Safway, at address given above, for additional information. Include dimensions of space available and seating capacity desired. We will assist in working out your bleacher problems and will furnish an estimate suited to your specific requirements.

BUILDING MAINTENANCE EQUIPMENT

Steel or New Aluminum Rolling Work Towers



(Illustrated at left) Follow progressive work—may be used indoors or outside. Casters lock at work location. Towers are easily assembled to height and shape required for the individual job. Now available in both tubular steel and new lightweight aluminum equipment.

Safway Hydro-Lift

One-man rolling work tower. Lift raises from 7 to 17 ft. on hydraulic ram, operated by worker from platform. Tower telescopes to clear small doors, 30 in. wide by 84 in. high.

(Right) Small Safway Bleacher—Provides 720 seats for Rotary Club, Wayne, Mich. Used for football and other events.



SNYDER TANK CORP.
P. O. Box 14, Buffalo 5, N. Y. • P. O. Box 2390, Birmingham 1, Ala.

SNYDER

STEEL GRANDSTANDS AND BLEACHERS

You pay "no more" for Snyder Steel Grandstands and Bleachers. Steel stands facilitate reduced maintenance, and Snyder engineering "Know How" assures safe seating with mass production techniques.

Flexibility is a must, and Snyder Steel Stands are designed for simple and quick installation or dismantling. Additional sections or tiers can be added to any Snyder installation, without alterations.

Snyder Steel Stands insure safe, comfortable seating, so when considering any installation check over the following: (1) All steel construction, with the exception of foot and seat boards; (2) Self supporting steel towers, angular braced for additional support; (3) Level locked in seat boards, with either bolt or locking devices; (4) Flexible joints at stringer to column connection to take care of ground settling, frost heaving and expansion; (5) Complete diagrams and instructions eliminate the need for skilled labor in erection or dismantling; (6) Estimates or help in planning available to you without obligation.

The Snyder Beatty Rollway folding bleacher, with 24 inch horizontal back to back seat spacing, is available for indoor use.



INDOOR • OUTDOOR • PORTABLE • SECTIONAL • PERMANENT

UNIVERSAL BLEACHER COMPANY

Folding Gymnasium Seating and Outdoor Grandstands

606 South Neil Street, Champaign, Ill.





Universal Roll-A-Way Gymnasium Stands

Scientifically designed and custom built for the utmost in safety, strength, adaptability and space-saving . . . *Universal* Roll-A-Way Gymnasium Stands offer everything you want and need.

● Vertical filler boards are located under center of each row, leaving ample leg room.

Full 18½ inches from seat rest to foot rest means more room per person seated.

● Folding-arm principle of operation assures easier operation, free from mechanical troubles.

● Sloping closed front is easier to clean and does not interfere with playing area in gymnasium.

● Double supports to floor under both seat and foot rests, together with full X-type cross bracing, means maximum safety and rigidity.

● Rows lock automatically in both closed and open positions, making it impossible to close part of the rows inadvertently when stand is partially occupied.

* * *

INFORMATION NEEDED FOR ESTIMATE: Give depth and length of each space to be filled and indicate size and location of any pilasters or radiators along walls.

ROLL-A-WAY TABLE OF SIZES

Rows*	3	4	5	6	7	8	9	10	11	12	15	20
Depth Opened	4' 8"	6' 6"	8' 4"	10' 2"	12' 0"	13' 10"	15' 8"	17' 6"	19' 4"	21' 2"	26' 8"	35' 10"
Depth Closed	1' 9¾"	2' 2"	2' 6¼"	2' 10½"	3' 2¾"	3' 7"	3' 11¼"	4' 3½"	4' 7¾"	5' 0"	6' 0¾"	7' 10"
Height at Rear	2' 11"	3' 7½"	4' 4"	5' 0½"	5' 9"	6' 5½"	7' 2"	7' 10½"	8' 7"	9' 3½"	11' 5"	14' 11½"

* Sizes not included in table are also available.





Universal Portable Wood Bleachers

Designed for ease and speed of erection; used effectively both indoors and out. Made of high grade, kiln dried Douglas Fir; bolted construction prevents splitting, assures greater safety. Special connectors eliminate overlapping of seat boards. Complete units are easy to move and store in minimum space. Table shows several group arrangements. Many others can be supplied.

SEATING PLANS			
Plan	Length	Rows	Capacity
1-W	75'0"	9	495
2-W	135'0"	10	990
3-W	210'0"	10	1540
4-W	180'0"	15	1980

Universal Steel Grandstands

Built to hold more than four times the rated live weight load, yet easily erected and dismantled. Non-overlapping seat and foot boards are supported by well-braced vertical legs direct to ground. Conventional type illustrated above. Also available in elevated type, with walkway along front. For prompt action, select a plan from table at right. Other sizes also available.

SEATING PLANS			
Plan	Length	Rows	Capacity
1-S	90'0"	8	520
2-S	138'0"	10	1000
3-S	198'0"	10	1430
4-S	234'0"	12	2028

WAYNE IRON WORKS

Wayne Penna.

WAYNE ROLLING GYMSTANDS

. . . for efficient gymnasium seating

WAYNE Rolling Gymstands are designed to provide maximum seating capacity in minimum space. Where floor space is needed for practice or gym classes, Rolling Gymstands can be rolled back against the walls, out of the way. For a dance, where use of part of the gymstand is desirable, one or more rows can be opened for seating, while the rest remain closed.



Wayne Standard and Recessed Gymstands (Model 50 & 50R) at Sharon, Pa.



Wayne Recessed and Special Gymstands (Models 50R & 50S) at Kankakee, Ill.



Wayne Movable and Special Gymstands (Models 50M & 50S) at Villanova, Pa.

WAYNE Rolling Gymstands can be opened in a matter of seconds—even units up to 23 rows deep! They are so designed that each section (which is about 16 feet wide) can be opened or closed in one continuous operation. Any desired number of rows can be opened and the stand *locked*, firmly, safely in place.

Balconies can be made a great deal more useful by the installation of WAYNE Rolling Gymstands. They are the ideal seating arrangement because they fold against the wall and permit maximum utilization of space.

Types of Wayne Rolling Gymstands

1. STANDARD — **MODEL 50**
   for use in a permanent location along a wall
2. MOVABLE — **MODEL 50-M**
   for use in a temporary location
3. RECESSED — **MODEL 50-R**
   for use in recess or permanent location away from wall
4. SPECIAL — **MODEL 50-S**
   for use where special rise per row is required, i.e. in balcony seating.

Outstanding Features

BETTER VISIBILITY
- greater angle of clear view
- greater slope of sight line

SOUNDER CONSTRUCTION
- column base plates transmit *live* load to floor
- column feet provide stability

SMOOTH OPERATION
- wheels travel independent parallel paths
- no floor grooving here!

SAFETY AND APPEARANCE
- fully closed riser boards
- completely vertical front when closed
- meets all, and betters most, grandstand safety codes, tests
- and regulations, including the rigorous *California earthquake test.*

For more complete details on Wayne Gymstands, request the ROLLING GYMSTAND CATALOG NO. R-54.

WAYNE IRON WORKS, 544 N. Pembroke Avenue, Wayne, Pa.

"Wayne Stands for Safety"

WAYNE PERMANENT and PORTABLE GRANDSTANDS

. . . for over 30 years designers, manufacturers and erectors of grandstands for schools, colleges and municipalities.

Wayne Grandstands are designed to provide maximum seating capacity, visibility, comfort and safety at economical cost. Sound engineering, quality workmanship and top grade materials make Wayne Grandstands a sound investment. Their flexible design makes them ideal for planned expansion programs.

Safety is paramount in all Wayne Grandstands. They are constructed to conform to the exacting requirements of the Safety Code for Grandstands of the American Standards Association, the Grandstand Regulations of the Commonwealth of Pennsylvania and the Standard Specification of the American Institute of Steel Construction. Stresses in wood conform to the recommendations of the United States Forest Products Laboratory. Dead load, live load, sway load and wind load are all provided for with a wide margin of safety.

Wayne Grandstands are engineered to meet individual customer needs and limitations and to conform with the requirements of the site.

Preliminary grading and leveling are not necessary in most cases, except to provide for utilization of areas under the stand.

Pictured on this page are just a few of the thousands of Wayne Grandstand installations throughout the country. Though they differ widely in appearance they are all constructed in accordance with Wayne's high standards of quality.

Types of permanent Steel Grandstands

TYPE BP—Closed Deck (water-proofed) The risers and treads of this grandstand are constructed of bent steel plates. H-section steel columns, anchored to concrete footings, support the stand. Stringers are of wide flange beams. The sides and front of the Type "BP" can be bricked in and the area beneath the stands utilized for locker rooms, rest rooms, or storage space.

TYPE BC—Open Deck—This grandstand affords maximum comfort, visibility and seating capacity at an economical cost. Steel supporting columns of this stand are set on concrete footing and the stringers are of channel and angle construction.

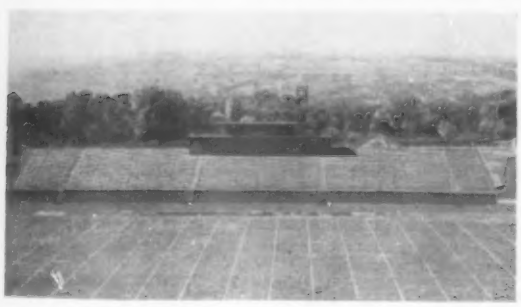
Types of portable Steel Grandstands

TYPE H—Light in weight, yet solidly constructed, the type "H" costs only slightly more per seat than ordinary wooden bleachers. A 6 row x 15′ unit can be moved bodily without dismantling. The Type "H" is available in any number of rows, from 2 to 25 and additions to the length or number of rows can be made at any time.

TYPE C—This Wayne grandstand is the most readily portable of any steel grandstand. It was designed for ease in handling, compact storage and quick, simple erection and dismantling. No tools, nuts or bolts are needed to assemble or disassemble the stand. For safety, the supporting struts of this stand are locked in place by means of a tie rod.

TYPE G—This is a top quality portable steel grandstand. Easily erected and dismantled, this stand is sturdily constructed, and can remain permanently erected if desired. The Type "G" is the ideal choice where a high portable grandstand is required. It can be erected in any number of rows from 2 to 50.

For more complete details on Wayne Grandstands, or for engineering assistance in planning your gymnasium or outdoor seating, write to Wayne Iron Works, 544 N. Pembroke Avenue, Wayne, Pa.





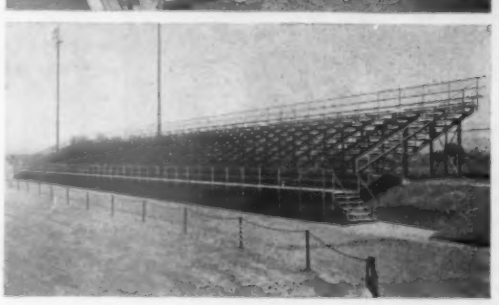
A—Wayne Type "H" Portable Grandstand at Clifton Heights High School, Clifton Heights, Pa.



B—Wayne Type "C" Portable Grandstand at Doyle Field, Leominster, Mass.



C—Wayne Type "G" Portable Grandstand at Lawrenceville, N. J.



Wayne Type "BC" Permanent, Open Deck Grandstand at York High School, York, Pa.

Wayne Type "BP" Permanent, Closed Deck Grandstand at Cornell University, Ithaca, N. Y.

M. D. BROWN COMPANY

East Lake Street, Niles, Michigan

FLASHER-TIMER Football Scoreboard



MODEL 1250-2

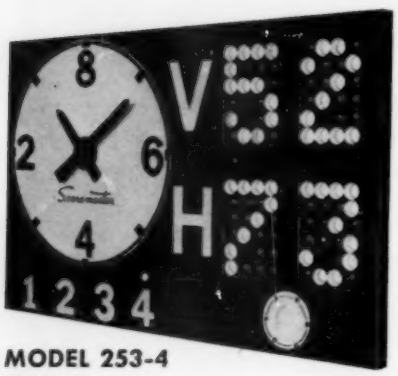
This marvel of modern design flashes time left for play, in minutes and seconds, by means of brilliant numbergrams. Timing mechanism is completely automatic, changing time by the second. The timer can be stopped instantly by the operator for time-out periods. It can be set to time any length period, also rapidly reset at any time. Upper left corner has red background; balance, green. Two brilliant football symbols show possession of the ball. The board is controlled by means of a compact, easy to operate control panel and multi-conductor cable, located at any convenient point in the stadium. All steel construction, baked enamel finish.

DIMENSIONS:

Board	8'4" by 18'4"
Numbergrams	12" x 18"
Football symbols	18" x 12"
Letters	12" high

Gigantic scoreboard for large stadiums also available.

Basketball timers and scoreboards



MODEL 253-4

Length	4'2"
Height	2'8"
Depth	6"
Shipping weight	90 lbs.
Clock dial diameter	25"

Horn sounds automatically at end of each period of play. The score indicators use 7½-watt colored lamps. Numbergrams are 10" x 6½".

Below—**MODEL 250-1**

This large streamlined and fully automatic board is the finest in scoring equipment.

Large enough for any gym
Modern in design
Accurate to the second

Length	7'8"
Height	3'1"
Depth	6"
Shipping weight	200 lbs.





MODEL 250-6

Has all the new features:

SYNCHRONIZED FLASHER-TIMER	LOUD HORN VIBRATOR TYPE
ELECTRIC NUMBERGRAMS	TRANSLUCENT TEAM NAMES
ALL UNITS ON SEPARATE CONNECTORS	REMOTE CONTROL

Overall size 72" x 34" x 6", numbergrams 6½" x 10", letters 5" high.

OTHER MODELS ALSO AVAILABLE

ALL-AMERICAN SCOREBOARD CORP.

General Offices: 271 Madison Avenue, New York 16, N. Y.

IN HILTON N. Y.'s NEW HIGH SCHOOL GYM



Photograph shows All-American Model A-610 on east wall of Hilton Central High School Gymnasium, completed in 1953. Over 13 feet long, this model features a spectacular instant-flash numeral timer.

OWNER: Hilton Central School District. Scoreboard was purchased under the supervision of the High School Principal, C. W. Luffman, and Mrs. H. Jenkins, Student Faculty Advisor.

ARCHITECT: Benjamin Ade, Rochester, New York

GENERAL CONTRACTOR: R. F. Hyland & Sons, Inc.

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for all size stadiums
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for all size gyms and field houses
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for all size stadiums
$470-$150,000



Other models available: Combination Football-Baseball, Hockey, Combination Basketball-Hockey, Boxing, Soccer, Track and other sports. Custom-built scoreboards designed to customer's specifications.

ALL AMERICAN SCOREBOARD

modernizes at new low cost

The all-electric basketball scoreboard recently installed in the Hilton Central High School Gym is the most modern scoreboard of its type in the country. Hilton is a modest size town in the farm belt of upstate New York.

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All-American's modern scoreboards are the product of 20 years technical research and development in this highly specialized field. Every all-electric scoreboard in major league operation today is designed and built by All-American. This is tested proof of quality, performance and leadership in modern functional design.

SAVE UP TO $100

With the famous inscription "LONGINES—OFFICIAL TIME" on the timer, you can deduct up to $100 from any All-American unit price. (Applications only accepted in writing.)

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Our engineers are available for free consultation on scoreboard facilities for your gymnasium or stadium. Cost estimates furnished. Write for our literature.

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73 Thayer St., Des Moines, Iowa

FAIR PLAY ELECTRIC SCOREBOARDS

THE ORIGINAL FIGURGRAMS

8 Times Easier to Read

Players, coaches, radio announcers and spectators agree Fair Play Scoreboards with the big FIGURGRAM numerals are 8 times easier to read than conventional dial type boards. Additionally, you can depend on 100% accuracy in reading when FIGURGRAMS are used.



FF-1S answers every requirement for fast, accurate scoring. Clock flashes every second of play and is completely automatic. Available in either ten or twenty minute clock. Can be reset anytime for short periods or overtime.



FF-4S is the same as the FF-1S but with four sides for easy reading from any point.



FB-50 for football, baseball, track or any outside event which requires timing or scoring. Has big 24" FIGURAM numerals . . . easy to read from any angle. All timing and scoring units controlled by push buttons except "yards to go" which is set by telephone type dial.

A Financing Tip: Many Fair Play Scoreboards have been donated by public-spirited individuals, groups and businesss.

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America's Most Popular Scoreboard . . . FAIR PLAY

For years, Fair Play Scoreboards have been the nation's leader. In basketball, as in every other sport, Fair Play has led the field because of economy, dependability and versatility. Important too is the fact that Fair Play Scoreboards feature the easy to read, 100% accurate FIGURGRAM NUMERALS. Now your own maintenance department can install and service Fair Play. And you'll find Fair Play prices within your budget.

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All The Facts at a Glance by FAIR PLAY

Everyone appreciates Fair Play Scoreboards. Coaches and athletes like the speed and dependability; radio announcers and spectators like the ease of reading and accuracy; maintenance men enjoy the simple installation and maintenance and your school board will appreciate the economy and versatility. It's no wonder Fair Play is the leader in Football Scoreboards the world around.

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FREE. Write today for your FREE BOOKLET, "What's the Score?" Gives all details and specifications for FAIR PLAY Electric Scoreboards.

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Webster City, Iowa

Naden ELECTRIC SCOREBOARDS

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BASKETBALL
BASEBALL

Featuring "Instant-Vue" Numerals



Instant-Vue Football Scoreboard
Model N-400-IV

This newest Naden scoreboard instantly flashes the exact minutes and seconds left to play. The 24" Instant-Vue numerals are formed from electric bulls-eyes and are easily readable. Made from heavy gauge aluminum with edges turned for extra strength. The face is finished with black wrinkled enamel to eliminate glare; the back reinforced with aluminum angles.



Dial-Type
Football
Scoreboard
Model N-400-D

This conventional dial type scoreboard is preferred by many officials. The eight-foot dial is quickly and easily read. The 12" numerals indicate minutes to play and the large red sweep-hand travels once around the dial each minute. Each graduation on the dial is one second. Long-lasting, pure white enamel is used on the dial and is baked on for durability.



Electric
Basketball
Scoreboard
Model N-595

This basketball scoreboard embodies the latest developments to insure accuracy and dependability. Truly rounded numerals are used which are far easier to read at a glance than block or semi-block type numbers. Each individual light is covered with its own plastic bezel which gives better angle vision and makes it simpler to service individual bulbs.

The numerals are 12½" high for excellent visibility. Constructed of steel with baked-on wrinkle enamel finish. Large, resonating horn is included as standard equipment. Easily installed by school personnel.

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Football installations include delivery, erection and checking of the scoreboard by factory crews.

CROUSE-HINDS COMPANY

Syracuse, N. Y.

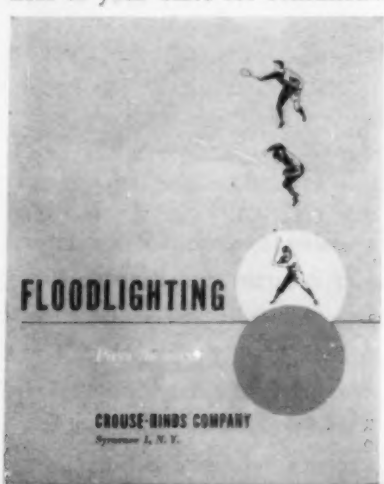
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Players, spectators, and thrifty administrators cheer the FLA sportslight, designed by Crouse-Hinds lighting engineers to combine high efficiency, quality, and economy in athletic field lighting. Easy to install and maintain, the FLA sportslight is helping to attract bigger crowds wherever it is used.

Better play, longer practice time, increased school spirit, and community support are only a few of the benefits which are yours with Crouse-Hinds floodlighting. The entire job of planning your installation to the smallest detail is performed by our lighting engineers. You may send a map of your field or stadium, or write us and we will send a field engineer to your office for consultation. We will furnish a complete layout of your field or stadium. You are under no obligation to us, and you pay NOTHING for our services, while receiving the benefits of our extensive experience in sports lighting.





Send for our FREE illustrated booklet, "Floodlighting Pays Its Way!" for details on how your school can profit from Crouse-Hinds scientifically planned indoor and outdoor sports lighting, used in schools and universities throughout the country.



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Floodlighting Makes Better Sports Programs Possible

Small schools can floodlight their sports fields economically with G-E L-69 floodlights.

Plant High School wanted to play games on the local school grounds instead of renting a field in another part of town. They believed that it would increase school spirit if the local community attended their sports events. Rent for the use of other stadiums required funds that would be available to them if their own field were lighted.

A floodlighting campaign was started to finance the new installation. The County School Board, the Plant High School Athletic Association, and the Plant High Dads Club all participated in gathering funds for the project. Public reaction was highly favorable.

The school and community are enthusiastic about the new floodlighting. They are able to play their games when they desire and to make their own schedules. Students can play on their home field when they want to, instead of trying to arrange for nights when other fields might be available.

The Junior High School also formed a league. The field permits them to play at night with a greater interest in athletics. Gate receipts have also provided money for the teams to buy uniforms, hire coaches, and still pay floodlight operating costs. Juvenile delinquency has decreased, because the new facilities give the students a place to spend their free hours.



G-E floodlights illuminating sports field, Plant High School, Tampa, Florida



FREE PLANS AVAILABLE—To help you with the planning of your recreation area, here is a free manual of plans based on "NEMA-authorized engineering information." Not only lighting plans but lists of materials are included. There are plans for any sport from archery to volley ball—with special sections for football, baseball, and softball. Write for Bulletin GET-1284C. General Electric Company, Section 640-382, Schenectady 5, N. Y.

Some Reasons for the Popularity of the G-E Type L-69 Floodlight



Simple, Sturdy Construction. Permits easy installation and provides a heavy-duty light with the lightest weight possible. Designed to keep out dirt, water, and insects, thus maintaining greater illumination efficiency longer.

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For more information, write for Bulletin GEA-6067, *G-E Type L-69 Floodlights for Sports Lighting.*

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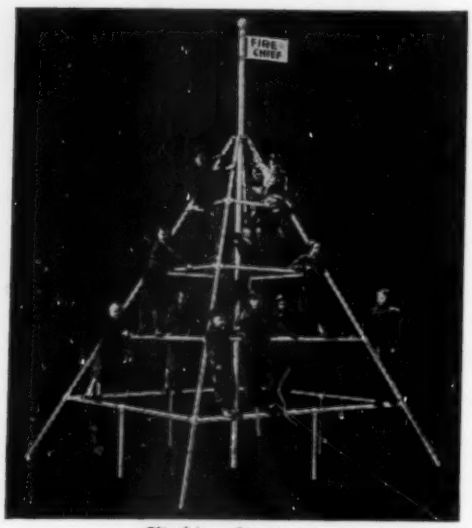
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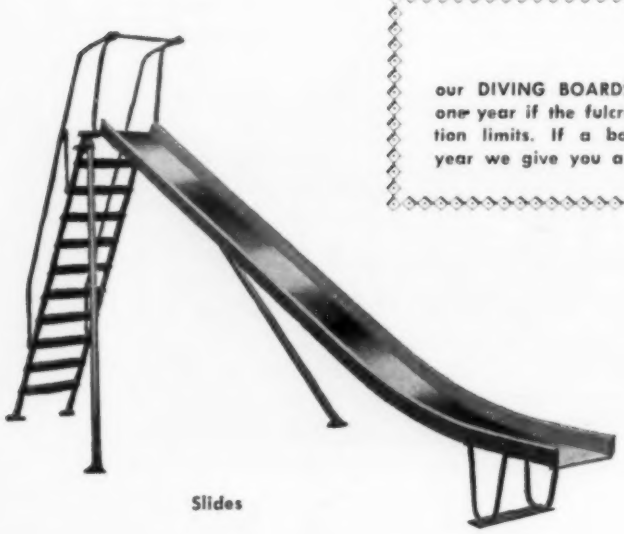


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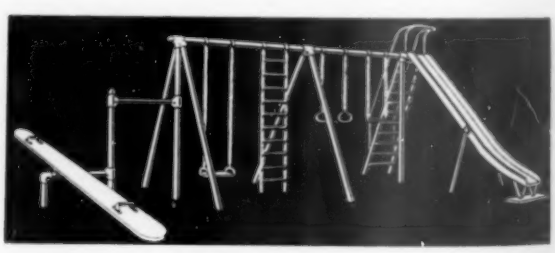
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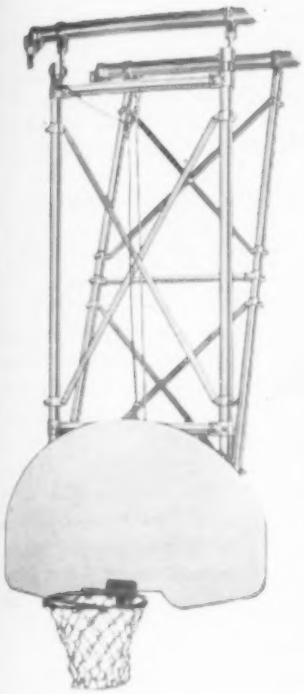


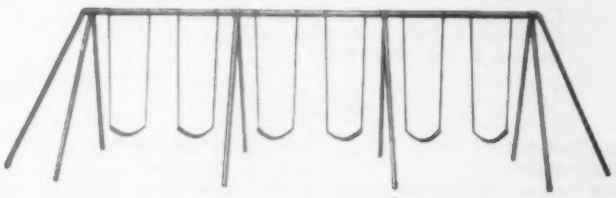
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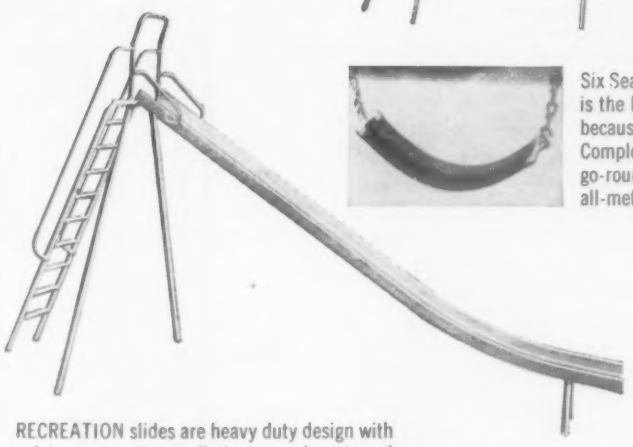
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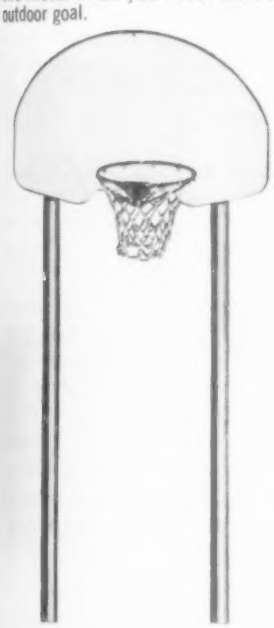


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RECREATION slides are heavy duty design with safety construction to eliminate rough spots and sharp edges. Chute bedways may be easily replaced. Lengths from 12′ to 30′.

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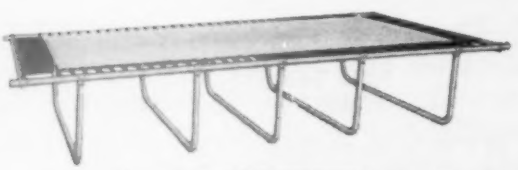
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H T H GRANULAR



Positive sanitation is of prime and constant importance to schools and universities everywhere—particularly in connection with swimming pools, gymnasiums and locker rooms. For such a wide variety of sanitary requirements H T H Granular is a convenient and reliable source of chlorine. A dry, granular, free-flowing, readily soluble product, H T H Granular contains 70% available chlorine and will retain that strength through long periods of storage. The convenient easy-to-handle 5-lb. cans of H T H Granular are packed nine to the case.

For Swimming Pools

For the continuous or periodic chlorination of swimming pool water, H T H Granular offers the advantages of dependability, simplicity and low first-cost of chlorinating equipment.

In addition to keeping the pool water safe, H T H Granular is recommended for use in a coordinated entrance-to-exit sanitation routine to keep locker rooms, foot baths, toilets, runways and other pool surroundings safe and sanitary. A valuable manual, "Keeping the Pool Safe and Sanitary," is available upon request, without cost or obligation.

HTH TABLETS AND THE HTH TABLET HYPOCHLORINATOR

H T H is also available in the convenient H T H Tablet form. H T H Tablets (with 70% available chlorine) dissolve slowly and provide a continuous source of available chlorine, over an extended period of time.

H T H Tablet Hypochlorination offers the ultimate in safety and convenience for accurately metering and feeding hypochlorite solutions. This equipment, specifically designed by Mathieson to dissolve H T H Tablets and to disperse the resultant hypochlorite solutions, provides a convenient and efficient method of feeding available chlorine at rates which can be accurately controlled and quickly varied to cover a wide range of operating demands.

The H T H Tablet Hypochlorinator is of practical design, compact construction, and attractive appearance. It is easy to install and simple to operate. Moreover, H T H Tablet Hypochlorination eliminates all measuring and weighing operations, and requires no preparation of stock solutions. The H T H Hypochlorinator is engineered to give long-time reliable service. First cost is low, and since the unit operates with no moving parts, maintenance and upkeep requirements are almost negligible.



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A revolutionary new H T H product for the laundry industry, Ad-Dri Bleach is added dry to the laundry wheel on the second rinse for family, institutional and diaper service work, and on the third rinse for linen supply and industrial work—eliminating tanks, crocks, liquid bleach carboys and other troublesome features of preparing bleach solutions. Ad-Dri provides greater chlorine dispersion for controlled, uniform, accurate bleaching results, assuring you maximum whiteness retention with the lowest possible tensile strength loss. Dry, stable Ad-Dri Bleach is available in 100-lb. and 200-lb. drums.

H T H-15—An all-purpose germicide and deodorant which is ideal for use in school kitchens, dormitories, camps, etc. H T H-15, containing 15% available chlorine, is highly useful as a china dip for the removal of stains from dishes and chinaware.

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PH-Plus—PH-Plus restores the alkalinity which pool water loses especially when cylinder chlorine is used for disinfection—eliminates the acidity that makes eyes smart—makes purification more effective and residual chlorine less noticeable. Made in convenient, fused ½-lb. cakes, packed in 100-lb. bags.

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WALLACE & TIERNAN INCORPORATED

Wallace & Tiernan is a completely integrated organization of specialists in chlorination and chemical feeding. For over 40 years this alert, progressive company has pioneered with such well-known developments as the visible vacuum principle in which chlorine is metered under a partial vacuum, the widespread commercial use of Break-Point Chlorination, and the first practical residual chlorine recorder.

In the field of swimming pool treatment, Wallace & Tiernan has a wide variety of time-tested Chlorinators, Hypochlorinators, and Chemical Feeders which can meet the requirements of all pools regardless of size. In addition, Wallace & Tiernan equipment is installed under the direct supervision of a member of the Wallace & Tiernan Service Organization which is conveniently located in the cities listed above.

W&T EQUIPMENT

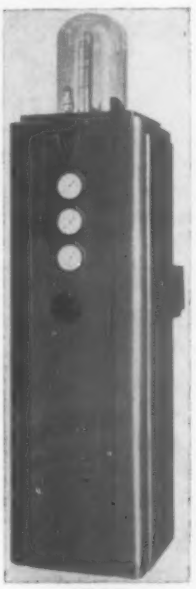


W&T Hypochlorinator Type HEMP

For Small Indoor Pools

W&T Hypochlorinators are particularly adapted to the needs of small pools. These rugged machines are easily installed. They take up only 4 square feet of floor space and require little attention. You just set the feed, turn on the power, and the system starts operating smoothly and efficiently.

These machines are available in the Electric and Belt Driven Types for Manual and Automatic Start and Stop Operation. Two other models using a Water Motor Drive are also available, one for Manual and the other for Automatic Proportional Control.



W&T Visible Vacuum Chlorinator Type A-418



W&T Chemical Reagent Feeder, Belt Drive, Type HBDM

For Large Outdoor Pools

W&T has direct feed, solution feed and visible vacuum feed chlorinators for every type pool. These rugged dependable machines are easy to maintain and require no skilled help to operate. Moreover, shut-down and start-up has been simplified to the point where it can be done easily and quickly—a decided advantage in intermittent pool operation.

Chemical Feeders

For the precise feeding of controlled amounts of such treatment chemicals as alum, soda ash, etc. W&T Chemical Feeders are compact, dependable machines, especially designed to do an economical, efficient job. They are available in four models, Electric, Belt Driven, Water Motor Drive Manual Control, and Water Motor Drive Automatic Control.

SERVICE

The W&T field service staff is always available to give prompt service on all W&T Equipment. This staff is prepared to suggest the proper chemical feed equipment for any swimming pool.

THE BENNETT MANUFACTURING COMPANY

Alden, New York

Manufacturers of a Complete Line of Self-Closing Waste Receptacles

BENNETT

WASTE RECEPTACLES



SPECIAL MESSAGES

Special messages may be stenciled on 1, 2, 3, or 4 sides of Bennett Bilt Waste Receptacles at slight extra cost.

MAKE CLEANLINESS and NEATNESS *Automatic*

Everybody is automatically a member of your cleaning department by conveniently placing Bennett Bilt Waste Receptacles to invite their use. That is why school and college officials buy these receptacles for washrooms, corridors, walks, shops and other places where waste accumulates. Bennett Bilt Waste Receptacles are sanitary, economical and a major help in cleanliness and neatness.

STURDY DESIGN to withstand continuous, hard everyday use is a direct result of over 40 years' experience in metal fabrication. *Non-rusting stainless steel feet; extra heavy gauge steel; all welded construction, reinforced corners; positive closing doors reduce fire hazards; phosphate treated metal and baked enamel finish provides neat appearance and increases corrosion resistance* are a few of the many features that make Bennett Bilt Waste Receptacles a natural "buy." WRITE FOR CATALOG.

AVAILABLE IN GREEN, GRAY AND WHITE FINISH





TABLE OF SPECIFICATIONS

Catalog Number	Size of Base	Body Height	Overall Height	Approximate Shipping Weight	Inner Containers Furnished As Standard
19-L	9" x 9"	4"	10"	7 lbs.	Galv. Inner Can With 25 Waxed Paper Bags
112-L	11½" x 11½"	27½"	34½"	28½ lbs.	1 Galv. Inner Can
125	11½" x 11½"	19"	26"	19 lbs.	25 Waxed Paper Bags
125-L	11½" x 11½"	19"	26"	27 lbs.	1 Galv. Inner Can
142	11½" x 11½"	34"	41"	26 lbs.	1 Heavy Osnaberg Bag
142-L	11½" x 11½"	34"	41"	33 lbs.	1 Galv. Inner Can
130	16" x 16"	26"	36"	33 lbs.	1 Heavy Osnaberg Bag
130-L	16" x 16"	26"	36"	43 lbs.	1 Galv. Inner Can
140 (Heavy)	16" x 16"	31"	41"	40½ lbs.	1 Heavy Osnaberg Bag
140-L (Heavy)	16" x 16"	31"	41"	52½ lbs.	1 Galv. Inner Can
148 (Heavy)	22" x 22"	37"	49"	77½ lbs.	1 Heavy Osnaberg Bag
148-L (Heavy)	22" x 22"	37"	49"	100 lbs.	1 Galv. Inner Can

Standard Colors: Green, Gray or White

Models 140-L and 148-L are ideal for outdoor use.
Specially designed, light weight shipping cartons protect receptacle and reduce freight costs.
NOTE: Model numbers with L are supplied with Galvanized Liners instead of bags.



UNITED METAL BOX CO., INC.

186 Seventh Street, Brooklyn 15, N.Y.

West Coast Distributor: Shoreline Metals, Los Angeles, California

UNITED

Delivers

Longer Lasting Service
Better Sanitary Efficiency
More for your money

SWING TOP WASTE RECEPTACLE



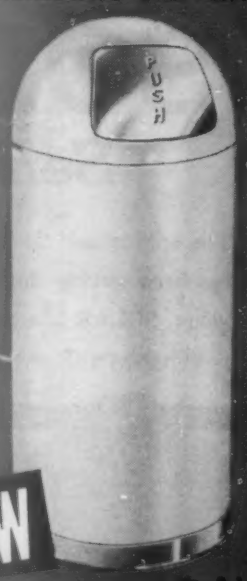
Stainless Steel Legs

- Electrically welded throughout of heavy gauge furniture steel.
- Two independently-operating scientifically counter-balanced silent doors. No springs to go out of order.
- Tops gabled for strength. Mounted on two concealed hinges which hold top open when swung back. No interfering chains.
- Inner container easily removable.
- Bonderized. Heavy enamel finish baked on at high temperature.
- Colors: Olive Green, Hammertone Green, Gray, White. Inner containers furnished.

Catalog Number	Size of Base Inches	Body Height Inches	Overall Height Inches	Shipping Wgt. Lbs.	Inner Container Furnished as Standard
*110	11½x11½	18	24¾	20	12 Paper bags
112	11½x11½	28	34½	32	1 metal can
‡115	11½x11½	35	41¾	36	1 metal can
*130	16x16	27	35½	39	1 Burlap bag
*150	21x21	35	46	74	1 Burlap bag
*†150W	21x21	35	46	74	1 Burlap bag

* Available with galvanized inner containers.
† For outdoor use—special weather resisting finish.
‡ Also available with burlap bag.

IMMEDIATE DELIVERY



NEW

R-1536

UNITED

ROUND TOP RECEPTACLE

- One-piece construction.
- Stainless Steel base.
- Self-closing chrome-plated door . . . dependable action.
- Bonderized. Sanitary white, gray, hammertone green baked on enamel finish. Also special colors, chrome doors, all chrome.
- Beauty. Tops them all.
- Durability.
- Galvanized corrosion-resistant inner container with handle.

UNITED

SANITARY NAPKIN DISPOSAL RECEPTACLE



- Eliminates clogged drains. Promotes cleanliness.
- Has metal container, easily removed for disposal of contents.
- No. 13, illustrated, has two doors each individually foot pedal operated, to serve two booths. When doors are closed compartment is practically airtight and odorless. No. 135, single, serves one booth.
- Bonderized. Available in Olive Green, Hammertone Green, Gray, White.

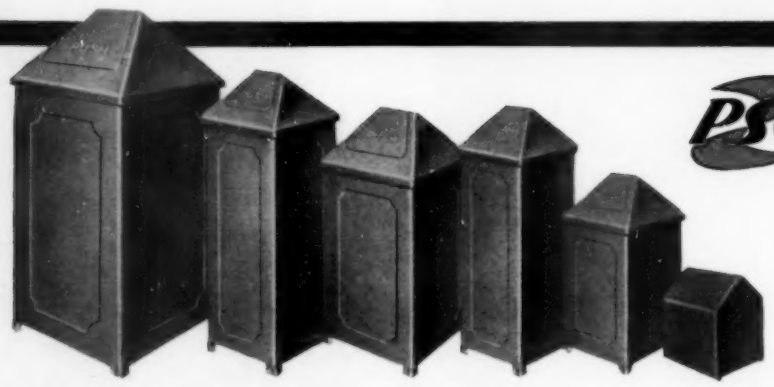
SOLAR–STURGES MANUFACTURING DIVISION

Pressed Steel Car Company, Inc.
Melrose Park, Illinois

SOLAR-STURGES

Self-Closing Waste Receptacles

The original self-closing waste receptacle, the SOLAR has been serving the educational field for over thirty years. SOLAR has no springs, weights, or hinges—nothing to repair or replace. There is only ONE moving part—the free-swinging top. Silent in operation and built to withstand tough usage, the SOLAR cuts cleaning costs, reduces fire hazards, and is always safe to use. Send for free illustrated literature today.



No. 250 No. 215 No. 230 No. 212 No. 210 No. 203

RECOMMENDED LOCATIONS

- Corridors
- Washrooms
- Locker rooms
- Cafeterias
- On the Grounds and Campus
- Laboratories
- Study Halls
- Libraries
- Infirmaries
- Administration and Faculty Offices

SOLAR FEATURES

ROUNDED CORNERS
ALL METAL BODY
SELF-CLOSING FLAP
STAINLESS-STEEL LEGS
RUBBER LEG GLIDERS
BAKED ENAMEL FINISH



Select Size and Color Best Suited To Your Needs	Model No.	Size of Base Inches	Body Height Inches	Height Over-all Inches	Approx. Shipping Weight	Equipped With	Recommended Location
All Solar Receptacles are finished in rich tonings of grey, green, or white enamel.	203	9x9¾	—	11	8 lbs.	12 Waxed Paper Bags	For sanitary napkins in women's toilets.
	210	11½x11½	17¾	23¾	15 lbs.	12 Paper Bags	For general use where space is limited.
	212	11½x11½	27	33	27 lbs.	1 Metal Liner	Drinking fountains, washrooms, etc.
	215	11½x11½	34½	40½	31 lbs.	1 Metal Liner	Drinking fountains, washrooms, etc.
	230	16x16	26	33	32 lbs.	1 Burlap Bag	Washrooms, corridors, offices, restaurants, etc.
	250	22x22	35	45½	64½ lbs.	1 Burlap Bag	For general use where there is a great amount of waste.
	260	22x22	35	45½	66½ lbs.	1 Burlap Bag	For outdoor use on streets, parks, and grounds.

H MAINTENANCE PRODUCTS AND BUSES

a. Building Maintenance

Advance Floor Machine Company	H 3
American Floor Surfacing Machine Co.	H 4
Clarke Sanding Machine Company	H 5
Continental Car-Na-Var Corporation	H 6
The Empire Varnish Company	H 7
The Fuller Brush Company	H 8
General Floorcraft, Inc.	H 9
Hillyard Chemical Company	H 10, 11
Hild Floor Machine Company	H 12
Holt Manufacturing Company	H 13
Huntington Laboratories, Inc.	H 14
The Kent Company, Inc.	H 15
Walter G. Legge Company, Inc.	H 16
Lincoln-Schlueter Floor Machinery Company	H 17
Multi-Clean Products, Inc.	H 18, 19
The Spencer Turbine Company	H 20
United Floor Machine Company, Inc.	H 21
National Vulcanized Fibre Co.	H 22

b. Fence

The Colorado Fuel and Iron Corp.	H 23
Continental Steel Corporation	H 24
Cyclone Fence Department, American Steel & Wire Div., United States Steel Corp.	H 25
The Stewart Iron Works Company	H 26
Anchor Post Fence Div., Anchor Post Products, Inc.	H 27

c. Grounds Maintenance

Devere Company	H 28
The Eclipse Lawn Mower Co.	H 29
Gravely Tractors, Incorporated	H 30
Worthington Mower Company	H 31
Yazoo Manufacturing Company	H 32, 33
American Bitumuls & Asphalt Company	H 34

d. Bus Transportation

Wayne Works, Inc.	H 35

ADVANCE FLOOR MACHINE COMPANY

2617 Fourth Street S. E., Minneapolis 14, Minnesota

Manufacturers of Floor and Rug Maintenance Machines—for polishing, waxing, scrubbing, shampooing, sanding, buffing



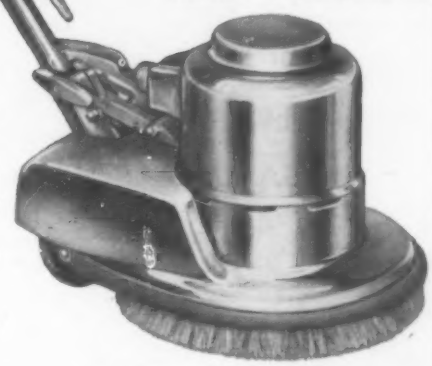
CUT FLOOR CLEANING COSTS

ADVANCE *Speedboy* DELUXE

Concentrated Weight FLOOR and RUG MAINTENANCE MACHINE

FOR POLISHING—WAXING—SCRUBBING—STEEL WOOLING—SHAMPOOING.

Advance Speedboy is designed for long years of smooth, efficient, heavy-duty service. It is ruggedly built of finest materials by a company that has produced top-quality floor machines for a quarter of a century.



Here's What Makes SPEEDBOY DELUXE Outstanding:

NEW-TYPE "SILENT-FLO" DIRECT DRIVE. Power transmitted by a neoprene covered steel cable Flex-O-Gear. All lubrication points sealed for life.

HANDLE FULLY ADJUSTABLE up to vertical storage position.

PERFECT BALANCE for effortless self-propelling operation.

DUAL-CONTROL SAFETY SWITCH of new, simplified design.

AUTOMATIC RAISING AND LOWERING OF WHEELS.

6 MODELS AVAILABLE

Detailed information available on request will show how Advance equipment can do your floor maintenance job better . . . faster . . . cheaper!

NOW — THE Speedboy "SPECIAL"

An **economy** machine, designed to provide dependable service at low cost. These are smaller, moderately-priced utility models of the Speedboy. But all are built to the rigid Advance standards of quality and dependability.



Convenient 3½ gal. tank shown available on all Speedboy models as optional equipment.

4 MODELS AVAILABLE

ADVANCE LOWBOY . . . the Floor Machine that's EASY TO HANDLE

(GETS UNDER FURNITURE — AROUND OBSTACLES — CLOSE TO WALLS)



LOWBOY 21
Advance's largest Lowboy model—for efficient operation on large areas. Twin-disc type—two 3-segment brushes rotating in opposite directions — 22½" brush spread. ½ H.P. motor. Only 6⅝" high over brushes.

LOWBOY 16
Somewhat smaller than Lowboy 21 but similar in design and construction, this twin-disc model is widely used in hospitals. Shown here with 2½-gallon tank, available on any model. 16-inch brush spread. 1/3 H.P. motor. Only 6¼" high over brushes.

LOWBOY 15
Designed with average-size rooms in mind. Single brush type with 15½-inch spread. Only 5⅝" high over brushes. Lowboy 15 has 1/3 H.P. motor.

LOWBOY 13
These smallest Lowboys easily slide under furniture and maneuver around obstacles. Single brush type with 13-inch spread. Similar in construction to Lowboy 15. Lowboy 13 has ¼ H.P. motor.

WRITE FOR FULL INFORMATION and detailed specifications.

ADVANCE FLOOR MACHINE CO.
2617 Fourth Street S.E. Minneapolis 14, Minn.

AMERICAN FLOOR SURFACING MACHINE CO.

516 S. St. Clair St., Toledo, Ohio

American does All!

SCRU[illegible]G
POLISH[illegible]G
STEEL-WOOL[illegible]G
DISC SANDI[illegible]
BUFFIN[illegible]
GRINDING





Wide-Mouth Tank

. . . corrosion-resistant . . optional equipment for all DeLuxe models. Capacity 15 quarts. Finger-tip control adjusts flow of liquid distributed through "Spray Feed" metal backed scrubbing brush.

New Improved American DeLuxe

with new "Swing-Around" Handle combined with Safety-Grip switch. Handle can be rotated so that built-in trailing wire is on either side. Big power . . . versatile . . . 14", 16", 19" brush spread.

SAVES LABOR and CUTS COSTS, TOO!

American Machines engineered with advanced features for performance and dependability—will materially reduce time, labor and costs in floor maintenance! Ample power for scrubbing, polishing, disc sanding, steel wooling, grinding. Also—proper sealing and finishing with American Floor Materials will reduce maintenance and cleaning costs on *any* floor. Your nearby American distributor will be glad to call and talk over your floor service problems, without obligation. Write . . . The American Floor Surfacing Machine Co., 542 So. St. Clair St., Toledo, Ohio.

Floor Finishes . . . a complete American line for *all kinds of floors.* There are American seals, finishes, waxes and cleaners for every requirement—glossy or [illegible]tin—fast-drying or normal drying—on wood, cork, linoleum, terrazzo, asphalt tile, rubber tile, concrete, plastic and other types. The right material for *long life* and *easy maintenance.*



New A.L.M. 13 Floor Maintenance Machine

An ideal low-cost utility machine . . . easy operation for scrubbing, polishing, steel wooling, disc sanding and buffing all floors. Designed for jobs requiring easy portability and reduced weight. G.E. heavy-duty motor. Brush speed 172 r.p.m. Handle can be rotated so built-in trailing wire will be on either side of operator desired.

New Water Pick-Up Machine

Speed up the clean up! Use this new American to vacuum up dirty water after electric scrubbing your floors. Powerful motor . . . heavy duty squeegee leaves a clean dry path 29" wide 15 gal. tank.

SCRUBBING
POLISHING
STEEL-WOOLING
DISC SANDING
BUFFING
RUG DRY CLEANING



CLARKE SANDING MACHINE COMPANY

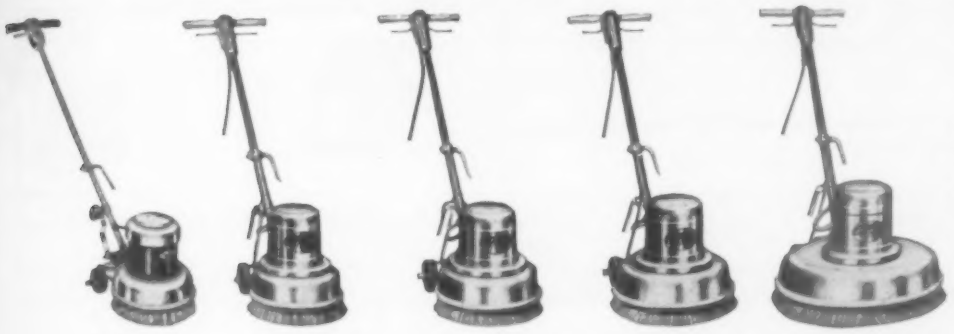
470 East Clay Avenue, Muskegon, Michigan

Clarke! . . . FOR FLOOR CARE BEYOND COMPARE

CLARKE FLOOR MAINTAINERS

Rugged construction, perfect balance, quiet operation and dependable year-after-year performance feature these machines. Scrub, wax, polish, steel wool, sand all floors, shampoo carpeted areas. Easily maneuverable in tight quarters, handle easily under chairs, desks, any low-type furniture. All models equipped with "finger-tip" control safety switch. Handles adjustable to suit operator. Sizes to fit all jobs.

Sales Representatives and Service Branches in All Principal Cities. Ask for a demonstration on your own floors!



P-11	P-13	P-15	P-17	P-23
Brush diameter 11"	Brush diameter 13"	Brush diameter 15"	Brush diameter 17"	Brush diameter 23"
Brush speed 175 rpm	Brush speed 169 rpm	Brush speed 169 rpm	Brush speed 169 rpm	Brush speed 141 rpm
Motor ½ hp	Motor ½ hp	Motor ½ hp	Motor ¾ hp	Motor 1 hp
Weight 34 lbs.	Weight 76 lbs.	Weight 96 lbs.	Weight 115 lbs.	Weight 134 lbs.



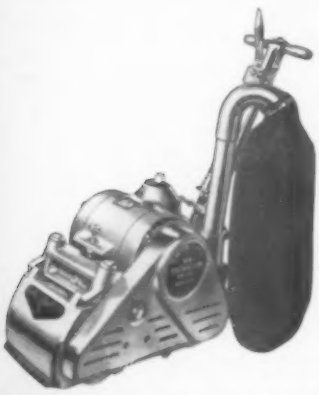
CLARKE SMOOTHIE SANDER

Ideal portable sander for doors, blackboards, desks, general maintenance. Works right up to corners and trim.



CLARKE DUO SANDER-POLISHER

Refinishes and polishes desks, blackboards, lockers, playground equipment. For school shop use. Light, powerful, portable. AC or DC. Write for catalog listing all accessories.



CLARKE FLOOR SANDER

The Clarke Model 504 is engineered for heavy-duty requirements. Ideal for large areas — gym floors, halls, etc. Rugged 2 h.p. motor develops 1600 r.p.m. and 2000 r.p.m. drum speeds. Life of sandpaper prolonged 30% by patented ratchet-type drum pressure control.



Model WD-23

Write for prices and descriptive literature

CLARKE WET AND DRY VACUUM

Removes water, dirt and dust. Powerful suction attained from special rubber mounted, moisture-proof 1 h.p. motor and three-stage turbine. Handy dump valve for easy draining. NEW automatic shut-off device for wet pick-up. NEW SELF-CLEANING bag for dry work. Porcelain inside and outside to resist rust. Extra tools for every cleaning need available. Various models designed for specific cleaning jobs.

FLOOR MACHINERY MANUFACTURERS ASS'N. CLEAN FLOORS PAY MEMBER



E-17 EDGER

Clarke's E-17 Edger is indispensable for stair treads, landings, narrow corners. Dustless operation. Includes headlight.

CONTINENTAL CAR-NA-VAR CORPORATION

1663 East National Avenue, Brazil, Indiana, U.S.A.

Los Angeles (Calif.) Factory: 6630 S. McKinley Ave., Phone: PLeasant 3-2653

Practical, Efficient, Inexpensive

CAR-NA-VAR

Maintenance Aids

FOR SCHOOLS AND UNIVERSITIES

Only the Silent Chief Floor Machines Give You the Superb NEW UNIFLOW Gear and Motor Assembly!

Motor and gears are a complete and single unit! Vertical motor with parallel gear shafts give full efficiency for motor. This eliminates the 10 to 20% loss in the transmission of power found with worm gear type assembly. This means more power, smoother operation, greater savings in electricity.

SILENT CHIEF
Polishing Machine

GIVES YOU:
Balance
Power
Efficiency
Economy

5 SIZES TO MEET EVERY USE
12" — 14" — 16"
19" — 22"





SILENT CHIEF
Rug and Floor Scrubber
Ideal equipment for all floor, rug and carpet scrubbing.



SILENT CHIEF
Special "12" (12" brush)
Weighs Only 35 pounds!
Polishes—Scrubs
HIGH SPEED LOW COST!

Now also supplied in 14" model
Weight 45 lbs.



EMPTIES ITSELF
New Car-Na-Var Vacuum Cleaner does a faster, more efficient job!

Improved Self-Emptying Ejecto-Vac now "Fool Proof" with by-pass motor.

NO. ! No dirty dust bag to empty . . . no need to remove the lid . . . Simply give top lever ¼ turn . . . contents are forced out through the hose.

For Sweetest, Easiest Cleaning ever . . .
"BEE-HIVE"
Vacuum Cleaner
Now Pick Up Dirt, Metal And Other Matter . . . Water And Other Liquids Without Special Adjustment . . . Ideal For Sucking Or Blowing!

Unbelievably Low Price



WRITE FOR DEMONSTRATION and more information on Car-Na-Var School Maintenance Aids.

CLEAN-O-SHINE A floor cleaner of a creamy consistency made from pure linseed oil and free from alkali, acids, abrasives, and therefore harmless to the finest finish; at the same time it is a highly efficient cleaner.

SANI-SOLVE A phenomenal new cleaning compound in liquid form. Not a soap. Adaptable for all washable surfaces in hard or soft water. Needs no rinsing.

CAR-NA-SEAL Especially adapted for gym floors. Floor sealer made of 100% Bakelite resins and tung oil—a penetrating surface seal for wood and other porous floors—tough as leather and thoroughly pliable. Made by Scientific Dowtherm Process. Approved by Maple Flooring Ass'n.

IN-SEAL A deep penetrating seal for "raw" wood or other porous surfaces. Recommended where no surface coating is wanted. Approved by Maple Flooring Ass'n.

CAR-NA-CRETE The super-surfacer for concrete floors. Made of rubber. Dries to a hardness 90% that of plate glass. Proof against moisture, alkali, gasoline, oils, etc. Resists hydrochloric, nitric, and sulphuric acids up to 50% concentrations. Resists water, heat, cold, and abrasion, also, high concentrations of lye.

CAR-NA-VAR Liquid floor wax and varnish combined. For all floors except asphalt and rubber. Must be buffed. Supplied in natural and colors. Approved by Underwriters' Laboratories.

CAR-NA-LAC A finish for floors which, in effect, is a lacquer made of wax. Self-leveling. Dries with high gloss. Approved by Underwriters' Laboratories for safety and Rubber Mfg. Assn. for rubber floors.

CONTINENTAL "18" Super finish for floors. Exactly the same as Car-Na-Lac except that it contains about 38% more solids than the average product of this type. Approved by Underwriters' Laboratories for safety. Also Rubber Mfg. Assn. for rubber floors.

GRIP-KOTE An anti-slip finish for floors. Especially adapted for asphalt tile. Approved by Underwriters' Laboratories for safety. Has 60% higher coefficient of friction than required, giving a safe footing on a fine, long wearing water-resistant finish. Applied with wax applicator. May be buffed when needed. Used successfully on asphalt gymnasium floors. Also approved by Rubber Mfg. Assn.

TERRA-PLATE New crystal clear, non-yellowing sealer for terrazzo, also adapted for marble, concrete, metal and wooden surfaces where quick drying is desired.

THE EMPIRE VARNISH COMPANY

WATERLOX DIVISION

2638 East 76th Street, Cleveland 4, Ohio

WATERLOX (TUNG-OIL) PRODUCTS

WATERLOX TRANSPARENT

A tung-oil product, it penetrates deeply into the pores of hard and soft wood, metal, cement and stucco, and prevents deterioration caused by moisture, salt air and water, acids and fumes and alkali. Elastic from a minus 70° to plus 700°F., it does not crack, chip or peel, and offers the greatest protection against all kinds of wear in a tough lasting finish.

An excellent floor finish—interior or exterior—and the finest protective coating for natural woodwork and furniture and also for window sills, trays and surfaces where moisture is encountered. Used as a vehicle with paint or enamel, it adds to the durability of either, enhancing both the life and beauty of the coating.

Waterlox Transparent, with its moisture-control feature, is used extensively for the decoration and protection of homes, factories, apartments, hotels, hospitals and institutions.

Write for a Waterlox Specification Chart!

WATERLOX HEAVY DUTY GYM FINISH

A new Waterlox Product designed as a quality finish of the greatest durability for gymnasium and club floors. Flows easily. Levels evenly. Dries quickly. Tough, though flexible, it is equally fine as a final finish on a sanded floor, a refinish on a sealed floor, or a top coating. Approved by the Maple Flooring Manufacturers Association.

WATERLOX HEAVY BODY FINISH COAT

Contains no wax or paraffin and expands as it dries to a transparent high gloss finish. Intensifies the color over which it is applied. An excellent final coating on hardwood floors, table and desk tops, wood or metal.

WATERLOX CEMENT FLOOR STRAIN

Not a paint, not a dye, but a blend of Waterlox Transparent and a skillfully developed pigment into a bright, colorful stain which combines greater durability with all the hiding qualities of the best cement floor paints. Appearance, long life and economy are joined to give you the most for your money. Six gay, sparkling colors give you a choice of coatings to brighten the cement-floored room.

WATERLOX FLAT-COAT

A high-hiding, oil base, flat paint processed with beautiful lime resistant colors. Spreads freely and covers smoothly over porous new plaster or wallpaper to gain painters' acclaim.

WATERLOX NATURAL SATIN FINISH

It has a satiny or wax-like luster on the surface on which it is applied although it contains no wax. This finish brings out the rich natural color found in wood without a shining gloss and is especially suitable for floors, furniture and wood trim. The final effect is that of a high-gloss material rubbed to a dull finish. Waterlox Natural Satin Finish is used as the final coat after the application of two coats of Waterlox Transparent as a penetrating sealer. This provides a water resistant surface that stands up under constant use and eliminates moisture stains. It is easy to clean and is quickly renewable.

WATERLOX WEATHER-CIDE

It is a new, special outside weather finish. This coating is designed to protect natural wood surfaces subject to the rigors of weather. Natural wood siding, doors, railings and trim are most completely protected against the elements when coated with Weather-cide.

WATERLOX ENAMEL

An enamel with a tung-oil base processed for use in places where moisture control is required. Dries without odor or fumes. Colors harmonize with modern color schemes. Will not crack, chip or peel after repeated washings and can be baked at temperatures from 200°F. to 275°F. Extremely efficient in hospitals, laundries and kitchens on wood or metal.

WATERLOX HADES ALUMINUM

Expressly formulated for protection of metal surfaces subject to extreme heat. Metal plates coated with Hades Aluminum can be heated to a cherry red and when cool, return to original color without flaking or peeling.

WATERLOX ALUMINUM PAINT

Complete protection for interior or exterior metal surfaces vulnerable to oxidation, acid or alkaline deterioration, or moisture. The finish for water or oil tanks, sewage plants and other outside metal finishes.

OTHER PAINT AND VARNISH PRODUCTS

In addition to products described in this catalog, we feature a complete line of varnishes, stains, enamels, and other products of interest to the architect and contractor. Detailed information on any of these will be furnished gladly on request.

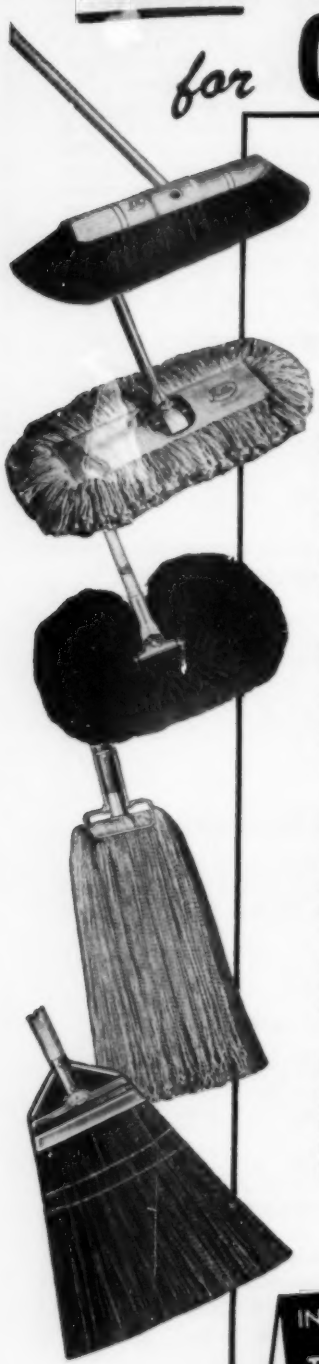
DESCRIPTIVE FOLDERS

Floor Maintenance — Uses and Facts
Cement Floor Stain — Masonry Coating
General Painting — Water Repellant
Specification Chart — Color Cards
WRITE THE MANUFACTURER!

THE FULLER BRUSH COMPANY

3566 Main Street, Hartford 2, Conn.

ALL THE TOOLS *for* CLEANING SCHOOLS



FLOOR BRUSHES

Brush materials include nylon, bristrand, horsehair, fiber and mixtures, geared to the job. 12″ to 36″ widths. Full, firm sweeping surfaces that wear down evenly. Solid hardwood blocks.

LAUNDERABLE SWEEPING MOP

Fully washable, 4-ply cotton yarn with long trim. All in one piece. Pre-shrunk canvas backing . . . easy to replace. Zipper opening does away with tape ties. In widths from 12″ to 48″.

DRY MOPS

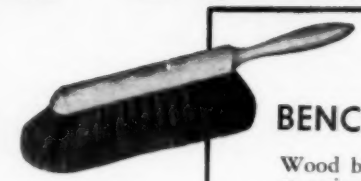
Three sizes — 36″ x 12″, 18″ x 11″, 12″ x 8½″. Sanitary. Cleans your floors thoroughly in a jiffy.

WET MOPS

Maximum absorbency, easy rinsing, long wearing. Three types of construction — narrow tape, wide tape, solid head in 12, 16, 20, 24, and 32 ounce weights. Made of 4 ply, 9 ply and 30 ply long staple cotton yarns.

FIBER BROOMS

Long-wearing fibers, set in metal case, wear down evenly...do not heel over...are not affected by water.



BENCH BRUSHES

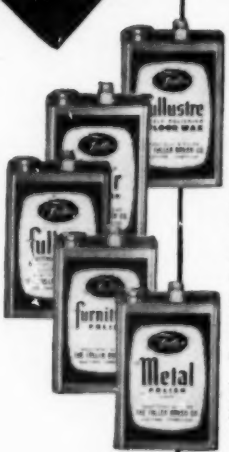
Wood back or Fullergript construction. Made in a wide variety of materials including horsehair, fiber, bristrand and various mixtures.

PAINT BRUSHES



For every painting and varnishing job — pure bristle, 70% bristle 30% horsehair mixture (U.S. Gov't. Regulation), and 100% nylon brushes.

WAXES, POLISHES & CLEANERS



FULLUSTRE SELF POLISHING FLOOR WAX . . . dries with a bright lustre without buffing.

LIQUID FLOOR CLEANER . . . quick-action. Safe for all floors. Highly concentrated.

FULLTROL . . . a deodorizing cleaner and sanitizer. Kills germs.

FURNITURE POLISH . . . oil or cream style. Leaves no film.

METAL POLISH...non-inflammable. Gives long-lasting finish.

Also: cotton dusters, scrub brushes, toilet brushes, test tube brushes, bottle brushes, tumbler brushes, window brushes, venetian blind brushes, radiator brushes, wall brushes, squeegees (floor and window), wax applicators.

INDUSTRIAL DIVISION
The **FULLER** BRUSH COMPANY
3566 Main Street
HARTFORD 2, CONN.

FOR INFORMATION WRITE TO . . .

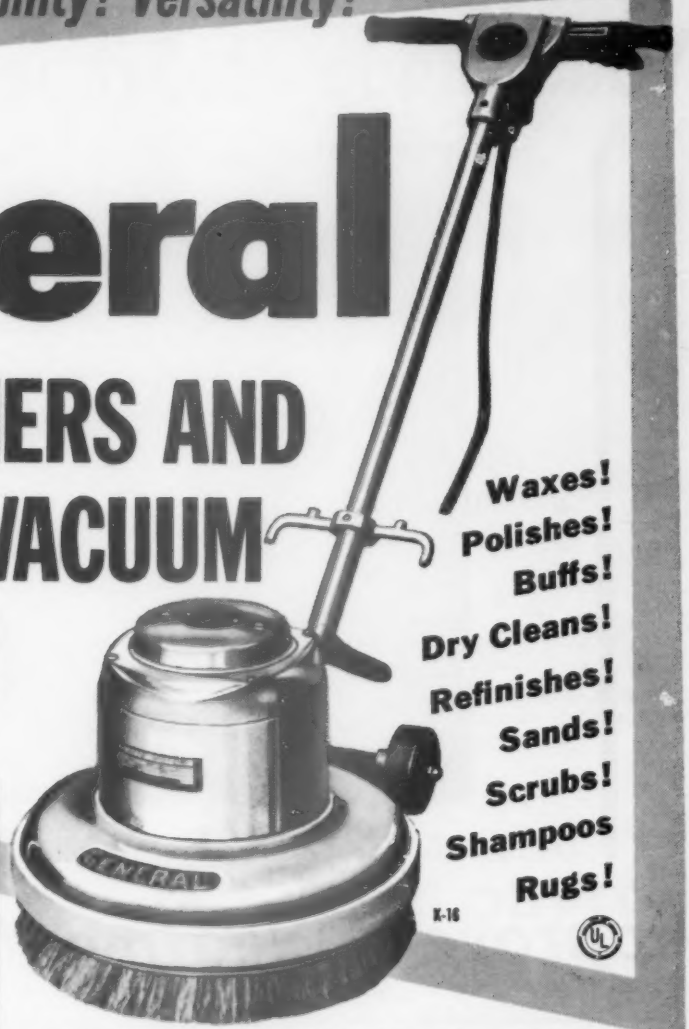
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GENERAL FLOORCRAFT, INC.
421 Hudson Street, New York 14, N. Y.

Famous for Economy! Durability! Versatility!

General

FLOOR POLISHERS AND COMMERCIAL VACUUM CLEANERS!



Waxes!
Polishes!
Buffs!
Dry Cleans!
Refinishes!
Sands!
Scrubs!
Shampoos
Rugs!

K-16



NEW!

General Commercial Vacuum Cleaner!

More Horsepower! *More* water lift! *More* air volume! 1¼ H.P. By-pass Air Cooled motor for quicker . . . more powerful . . . trouble-free operation on dry and wet pickup!

HOSE ATTACHES IN 1/2 SECOND FLAT!

Revolutionary ball bearing, swivel, snap attachment is world's quickest by stop-watch test! Ends coupling and uncoupling time-waste!

Here's Why GENERAL Gives You Maintenance-Free Operation!

1. **Operating Ease!** Industry's most perfectly balanced machine!
2. **Cost-Cutting!** Does toughest jobs fastest and finest!
3. **Economy!** Designed by floor-wise engineers with over 30 years experience!
4. **Durability!** Engineered for continuous duty!
5. **Versatility!** Works wonders on wood, asphalt tile, marble, rubber, linoleum, cork, terrazzo!
6. **Value!** Generals are known as the ultimate in floor machines!

General FLOORCRAFT, INC.
421 HUDSON STREET • NEW YORK 14, N.Y.

WORLD'S MOST COMPLETE LINE!


FLOOR-CRAFTER-12

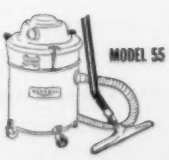

TWIN-12


TWIN-16


K-12


K-14


K-18


MODEL 55

HILLYARD CHEMICAL COMPANY

215 Robidoux, St. Joseph, Missouri

Warehouses in Principal Cities

45 Years as Manufacturer of FLOOR TREATMENT · MAINTENANCE · SANITATION PRODUCTS · and EQUIPMENT
Specialized for wood · asphalt · rubber · linoleum · terrazzo · magnesite · tile · cement

Your Guide to School-Safe FLOORS



See Opposite Page for Listing of Helpful "How-To" Folders . . .

Approved Treatments by Hillyard

	WOOD	GYMS	TERRAZZO, CEMENT MAGNESITE	MARBLE, SLATE CERAMIC, QUARRY TILE	ASPHALT TILE LINOLEUM RUBBER
CLEANING	· SUPER SHINE-ALL 100% Neutral Chemical in Action — More thorough — No-Rinsing — Safe for any floor				
SEALING	Penetrating Seal No. 21 provides smooth undercoat.	Wood Primer binds together porous cells.	TERRAZZINE for slow curing protection-use during construction stages.	ONEX-SEAL a combination seal-finish prevents surface checking, efflorescence.	HIL-TEX seals off dirt-catching pores.
FINISHING	Self-polishing SUPER HIL-BRITE wax, anti-slip and water-resistant.	STAR GYM for tough non-skid no-glare beauty.	ONEX-SEAL gives a traffic resistant glossy finish. *New WHITE Onex-Seal.	*New WHITE ONEX-SEAL makes white cement, terrazzo whiter—adds light reflection to floors.	HILCO-LUSTRE Renewer for slip-resistant finishing and surface safeguarding.
MAINTAINING	SUPER HIL-TONE—a specially formulated non-greasy dressing for labor-free dust-up of wood floors and gyms. Leaves no slippery residue. Will not darken floor.		NEW HIL-SWEEP DRESSING SAFE ON EVERY TYPE OF FLOOR INCLUDING ASPHALT TILE. Picks up dust—then completely evaporates. Spray it or brush it on the floor. Won't load mop. Has no flash point. Rags saturated with the solution will not burn. Gives you a dust-free floor with renewed lustre.		

HILLYARD CHEMICAL COMPANY

"HOW TO TREAT" FOLDERS *Free on Request*



Hillyard products approved by School Architects • Flooring Contractors • Flooring Manufacturers • Maintenance Men—now in use on thousands of finest school floors coast to coast.

Hillyard ...on your staff-- *not* your payroll

Write For

1. *Why Strip* and Wax the Hard Way . . . shows you comparative dollar and cent savings to be achieved by using high grade, water-resistant Super Hil-Brite wax.
2. *AIA Specifications* on every type of floor. Sweets Catalog 12L / Hi
3. *How Super Shine-All* protects and maintains Tile Installation.
4. *Gym Marking Chart*—blueprints standard markings, complete directions for finishing or refinishing gym floors.
5. *The Proper Treatment for Terrazzo or Cement Floors* with special instructions on the maintenance of white terrazzo, marble, or cement.

A nationwide staff of 120 trained Hillyard floor experts is on your staff not your payroll . . . to guide you in proper product selection, proper methods to get the MOST out of the superior quality built into every Hillyard floor treatment product. Call or write Hillyard direct for the name of the Hillyard Maintaineer nearest you.

SEE OUR CATALOG IN SWEET'S

FLOOR HILLYARD TREATMENTS

Write HILLYARD
215 Robidoux

ST. JOSEPH, MO. BRANCHES IN PRINCIPAL CITIES

HILD FLOOR MACHINE COMPANY

Factory Branch
250 E. 43rd St.
New York 17, N. Y.

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740 W. Washington Blvd., Chicago 6, Ill.

Factory Branch
4271 W. Third St.
Los Angeles 5, Cal.

HILD MAINTENANCE EQUIPMENT

does scores of clean-up jobs faster . . . better . . . easier



HILD Floor Machines

HILD Floor Machines may be used to condition floors of all kinds . . . then keep the floors sanitary, sparkling clean and bright. With easily interchangeable attachments, just *one* HILD Floor Machine is used to scrub, wax, polish, buff, sand, grind or steel-wool floors of every type.

Self-Propelling . . . Efficient . . . Heavy Duty

Being self-propelling, Hild Floor Machines require only effortless guidance . . . can easily be operated by a woman. The machines connect to any base outlet or lamp socket . . . operate with scarcely a whisper of noise.

On the four larger models, handles are adjustable to operator's height. All models have non-marking rubber bumpers, white vinyl plastic grips, and the HILD Safety Switch with insulated switch lever comfortably padded with rubber. Sound engineering at all strain points makes for years of dependable, trouble-free service.



Two Types . . . Six Models . . . Four Brush Sizes

HILD Floor Machines are available in either of the two types pictured here . . . plain handle, or tank type to carry 3 gallons of soap and water in the tank mounted on the handle. HILD Tank Type machines are used with the Hild Shower-feed Brush to scrub floors with utmost efficiency. Also used to shampoo rugs and tacked-down carpeting.

	Junior	Model "A"	Model "V-A"	Model "C"	Model "UC"	Model "D"
Motor H. P.	1/3	1/3	1/2	1/2	3/4	1
Brush Spread	11 in.	14 in.	14 in.	16 in.	16 in.	19 in.
Cable Length	40 ft.	40 ft.	40 ft.	40 ft.	40 ft.	50 ft.



HILD Model "K"
a dependable low-cost floor machine

This dependable, highly efficient machine offers many advantages of larger, more costly floor machines. So simple even a child can operate it. Interchangeable attachments to scrub, wax, polish, buff, sand, steel-wool. Equipped with 1/3 H.P. motor, greaseless belt drive. Brush spread 12½ inches. Brush speed 210 r.p.m. Automatic safety switch in handle. Light weight . . . only 34 lbs. without brush.





HILD "Fool-proof" wet-and-dry Vacuums

The HILD Vacuum is always ready for any clean-up job . . . wet or dry. No filter to change . . . no risk of damaging the machine because a careless or untrained operator has forgotten or neglected the "preliminaries". Moisture or dust in the vacuum air stream can cause no damage to the specially designed HILD Bi-Pass Motor. Available in two sizes . . . 15 and 55 gallon tanks with 10 and 40 gallon liquid capacity. The larger size is mounted on a heavy steel dolly and is equipped with a two-inch gate valve for fast, easy emptying.

Does all these Clean-up Jobs

The HILD Vacuum with interchangeable attachments does many clean-up jobs faster and better. It completely takes up scrubbing solution from floors . . . no rinsing or mopping. It sweeps floors "with air" . . . raises no dust. It vacuums dust from ceilings, walls, ventilating outlets, overhead pipes, etc. Hi-up extension eliminates use of ladders or scaffolds. It cleans out desks, chalk rails, shelves, etc. It quickly dries up flooded areas.

HILD System
MAINTENANCE
EQUIPMENT & SUPPLIES

Ask for a
FREE DEMONSTRATION
on your own floors



HILD Model 215
Heavy-duty Vacuum
for dry work only

Quality-built throughout, but economically priced below the cost of wet-and-dry vacuums. Quiet in operation. Powerful suction developed by ⅝ H.P. hi-speed motor and multi-stage turbine type fans. Handles easily . . . machine tracks perfectly at the slightest tug on the hose. Numerous attachments for scores of clean-up jobs on floors, carpets, furniture, walls, ceilings, shelves, pipes, machinery, etc.

HOLT MANUFACTURING COMPANY

Room C4, 669—20th St., Oakland 12, Calif. 272 Badger Ave., Newark 8, N.J.

CUT OUT COSTLY HAND CLEANING...

use **HOLT**

Floor Maintenance *Machines*

Wide Choice Enables You to Select Right Machines For Your Exact Needs and Budget

All HOLT floor maintenance machines are ruggedly built, include these special features:

- Non-marking rubber bumpers and cables — no unsightly marks on baseboards, walls, etc.
- Safety handgrip control to stop machine instantly, prevent runaways.
- No static shock—rubber grip, rubber trigger, and static eliminator wire in brush.
- Ball-bearing motors grease sealed for life.



HOLT All-Purpose Polisher . . . with interchangeable attachments . . . removes old wax, degreases concrete floors; scrubs tile, marble, terrazzo; cleans and waxes in one operation; steel wools, buffs, pumices, grinds; shampoos rugs and carpets, etc. Patented, self-levelling brush bracket cuts out "hop," reduces operator fatigue and brush wear. Brush spreads 12" to 20".

Specially-built explosion-proof, corrosion-proof machines for shipboard and hazardous industries also available.



HOLT Rug Shampoo Machine scrubs and shampoos grimiest rugs and carpets "whistle" clean. Converts quickly for waxing, polishing, steel wooling, tough floor maintenance. Brush sizes 12" to 20". Also tank-over-motor models with twin handles.



HOLT Heavy-Duty Vacuum has 60-inch water lift, handles both wet and dry pick-up without changing bag. Recommended for wet pick-up when completing rug scrubbing and shampooing, wet clean-up of floors, and heavy-duty dry pick-up. 15-gallon tank rust and corrosion-proofed. Easily converted to blower. Medium-duty, VA6, for small buildings.

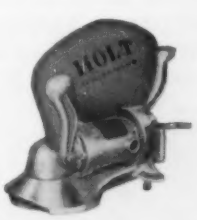


HOLT Whirlwind Upholstery Scrubber can't be beat for scrubbing and shampooing upholstery, small rugs, hard-to-reach corners and stairway runners. Marine-type pump provides positive solution feed to brush—no hand pumping. Motor and solution regulated by brush head controls for instant shut-off—no danger of flooding. 7-gallon tank; weight 70 lbs., easy to handle.



Refinish floors yourself with **HOLT Sanders.** Easy to handle, smooth operating.

HOLT Rotary Edgers make easy work of sanding edges, corners, stairs, closets, etc.



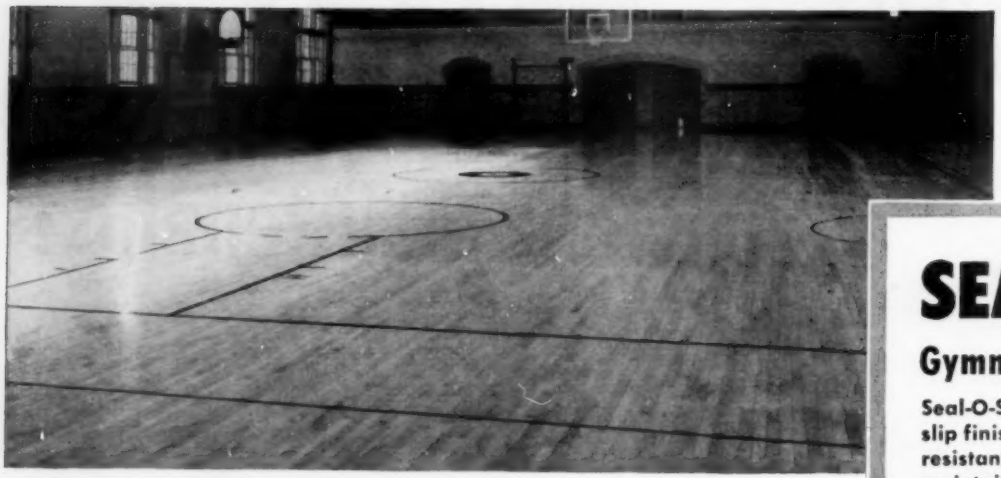
Sales and service centers in major cities. Write NOW for descriptive literature, prices and name of nearest distributor.

More than 25 years experience building better floor machines.

HOLT MANUFACTURING COMPANY

HUNTINGTON LABORATORIES, INC.

Huntington, Indiana · Philadelphia, Pennsylvania · Toronto, Canada



The Seal-O-San Floor at
Colgate University
Hamilton, New York

SEAL·O·SAN®

Gymnasium Floor Finish

Seal-O-San makes a beautiful, non-slip finish which is tough and wear-resistant. It is easy to apply and maintain because it penetrates the wood and uniformly seals the cracks and fills the pores so that it is impervious to dirt, water, grease or stains. Almost universally, coaches like Seal-O-San because it ends the problem of slippery floors. Hence, team play improves. Seal-O-San is in use in more than 9,500 schools!

NO SLIP · NO GLARE · LESS WEAR

SPAL CONCENTRATE*
A synthetic detergent for hard or soft water. It works both mechanically and chemically to remove heavy, oily dirt and float it away. Surface dries free of dulling film. Safe to use on any material unharmed by water alone.

FLOOR-SAN CLEANING COMPOUND*
A universal cleanser that's easy to use, and safe on every surface unharmed by water. Floor-San contains a water softener, emulsifying agents, synthetic detergent and soap, carefully balanced and refined. It is ideal for use on painted walls, woodwork, and rubber or metal fixtures, as well as all floors.

KOREX GERMICIDAL CLEANER*
A remarkable compound of soap, detergent and germicide, which cleans, disinfects and deodorizes in one operation. Korex eliminates the need for several products. Kills communicable disease germs. Safe on any surface unharmed by water. Use Korex to assure germ-free rooms for all primary grades.

HUNTOLENE ANTISEPTIC FLOOR MAINTAINER* Contains a powerful sanitizer that controls germs on the floor and in the mop and keeps them from multiplying. Used in the dust mop, it holds dust on the floor, keeps air free of dust and germs. Huntolene mixes with water so can be washed out of the mop, leaving it clean and fluffy.

NEO-SHINE WAX*
A concentrated self-polishing water-dispersed wax. Made with No. 1 yellow Carnauba. Produces high gloss with less labor. Wears up to twice as long as wax of ordinary concentration. Saves on maintenance and reapplication. Safe on all floors.

WEATHERALL SELF-SHINING WAX
A self-polishing water-dispersed wax containing genuine Carnauba. Weatherall has special ingredients which give great water resistance. Stands up well under heaviest traffic.

COSMOLITE ANTI-SLIP WAX*
Two distinctive advantages—it virtually eliminates slipperiness and yet, unlike ordinary anti-slip waxes, stays polished and glossy with a minimum of maintenance. Contains a high percentage of pure Carnauba, is very water resistant, and dries bright without buffing.

FOAM-X for Athlete's Foot
A new approach for combating athlete's foot that is highly effective. It penetrates quickly, toughens the skin and steps up resistance. Eliminates sloppy foot baths.

HUNTINGTON TOILET BOWL CLEANER Forms a strong cleaning solution with water . . . safe on porcelain. Because each crystal is a perfect sphere, the powder will not cake in the can.

POR-SAN PORCELAIN CLEANER*
A very fine porcelain cleaner containing specially selected, mild abrasive, soap and synthetic detergents. Cuts grease; cleans fast.

GERMA MEDICA LIQUID SOAP WITH HEXACHLOROPHENE* A liquid antiseptic hand soap of outstanding quality. Widely used in schools, institutions and industry to help prevent the spread of disease and cut down absenteeism. Kills germs without irritating the skin. Germa-Medica with Hexachlorophene is highly concentrated, and is diluted with 3 or 4 parts water before use. Hence, it is quite economical in use.



FLOOR MACHINES

SILENT HUNTINGTON FLOOR MACHINES A powerful machine for heavy duty, general maintenance, polishing and scrubbing. 16" brush, ½ h.p.

CABINET-SAN*
A highly concentrated, perfumed space-deodorant . . . to be used as a spray in rooms, corridors, cabinets or on fabrics. Packed in pressure cans as illustrated at right. Easy to use; easy to store.



DEODORANTS

Ask for Helpful Literature

HUNTINGTON LABORATORIES, INC.
Huntington, Indiana

*Registered, Huntington Laboratories, Inc.

THE KENT COMPANY, INC.

174 Canal Street, Rome, New York

KENT

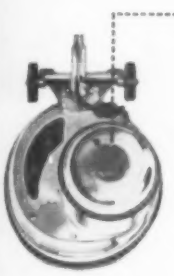
CUTS LABOR COSTS 18.9%

Time after time, in actual usage tests, Kent Floor Machines out-perform competitive makes slicing labor costs by as much as 18.9%! Typical are test results obtained by a major user who recently standardized on Kent 17" machines. Five separate time tests were made on 3850 sq. ft. of floor area. The Kent 17" won each test. The final report—"On entire 40-acre floor space, Kent will save 6142½ minutes — 102 man-hours per 5-day week."

Here's what you save

Kent's Balanced Power Machines pay for themselves by producing savings like these when compared with ordinary makes:

If your floor area is —	Hours saved annually (polishing three times a week)	Money saved annually @ $1.25 per hr. wage
24,000 sq. ft.	210 hrs.	$262.50
30,000 sq. ft.	242.1 hrs.	302.64
36,000 sq. ft.	315 hrs.	393.75
50,000 sq. ft.	438 hrs.	547.50



Balanced Power is the Key

Imperfect balance and torque — sidewise pull of the motor — make ordinary floor machines difficult to operate. Kent solves this problem with the exclusive OFFSET MOTOR DESIGN that counterbalances handle weight and minimizes torque. The result is BALANCED POWER. That's why Kent machines, operated by man or woman, steer with finger-tip ease — permitting *faster* work . . . causing *less* fatigue. Kent's Balanced Power also means that *all weight is on the brush*, distributed evenly so the job is done better . . . so brushes wear evenly and last longer. Plus:

- **FLOATING POWER** . . . another Kent exclusive that gives you extra years of trouble-free service — gears are cushioned to withstand shock . . . power flows smoothly from motor to brush.
- **ONLY 2 GEARS** . . . no chains or belts to adjust or replace.
- **HANDLE THAT ADJUSTS FOR OPERATOR'S HEIGHT.**
- **FULLY ENCLOSED MOTOR** . . . protects from dust and dampness . . . reduces maintenance problem . . . seals in noise.
- **SEALED GEAR CHAMBER** . . . assures positive lubrication for all moving parts.
- **AUTOMATIC RELEASE SWITCH** on handle assures full control at all times.

Write for further information
Kent Co., 174 Canal St., Rome, N.Y.

KENT PIONEER IN MAINTENANCE EQUIPMENT SINCE 1913



Kent's famous cleaning team — a K-line floor machine and a Quiet Triple Power Vacuum Cleaner (for dry or wet pickup).



K-LINE

Floor machines of 11, 13, 15, 17 and 22-inch brush diameter with famous Offset Motor Design are available.



VACUUM CLEANERS

For wet or dry work, both the Quiet Triple Power (illustrated in photo at top of page) and the new Quiet Jumbo (at left) have a special by-pass motor . . . no dust or moisture from vacuum stream can enter motor and cause damage. A smaller size also available.



BOILER CLEANER

The Quiet Triple Power Vacuum, with special attachments and auxiliary 27-gallon soot tank, cleans boiler flues faster . . . ends messy clean-up job.

WALTER G. LEGGE COMPANY, INC.

The Legge System of Safety Floor Maintenance

Architects' Building, 101 Park Avenue, New York 17, N. Y.



ONLY ONE WAY TO GET ALL 4!

- *Safer footing*
- *Sparkling appearance*
- *Longer-lasting floors*
- *Lower maintenance costs*

LEGGE Safety Maintenance gives you all this *Plus* The Free Services of a Trained Safety Expert

LEGGE Maintenance means more than just a product in a can. It provides the "know how" of a Safety Technician at no expense to you.

He analyzes the composition, area, age, condition and type of traffic your floors absorb. He prescribes products custom-tailored to your needs and plans a daily maintenance program. He conducts on-the-job training classes for your crews. He calls back frequently to offer assistance and advice.

It all adds up to: 1) Floors that gleam, without slipperiness. 2) A reduction of as much as 98% in slip-accidents. 3) Greater longevity — LEGGE-Maintained floors often last up to *10 years longer*. 4) A saving of up to 33⅓ on floor maintenance costs.

LEGGE SAFETY FLOOR CLEANERS

TEXINOL: An all-purpose concentrate for surfaces which cannot be harmed by water. Cleans thoroughly, economically, leaving no slippery film on floors.

TEXSPAR: A heavy-duty paste concentrate. Effective on cleaning tasks considered too difficult for ordinary cleaners.

TRAFCO CLEANER: A slip-resistant solvent that prepares floors to be polished with TRAFCO and TRAFLECO. Removes dirt, old wax and rubber burn marks.

FLOORSHINE: For terrazzo, marble, travertine, quarry tile, other hard-surface floors. Combination cleaner and slip-resistant polish. Also effective as secondary maintenance on other polished floors.

Other cleaners available for specific requirements.

LEGGE SAFETY FLOOR POLISHES

LECO: For linoleum, rubber, asphalt tile, cork, linotile and similar resilient floors. Gives high slip-resistant finish despite attractive gloss. Protects floors with durable film. A water-emulsion polish.

LEGSURE: For floors similar to those polished with LECO. A self-polishing scuff-resistant, lustrous Safety Polish.

SAFCO: For asphalt tile floors. A water-emulsion polish with higher slip-resistance for harder surfaces. Apply either LECO or SAFCO with a mop.

TRAFLECO (or TRAFCO): For wood, cork, linoleum floors. A solvent, tough-wearing polish, ideal for heavily trafficked floors. Slip-resistant.

Other Safety polishes available for specific requirements.

***All Legge polishes are listed by Re-examination Service of Underwriters' Laboratories.**

LEGGE FLOOR SEALS

Seal your floors against dirt and deterioration with these Legge Products:

CEMENT SEAL: A penetrant that prevents dusting.

TERRAZZO SEAL: Brings out true coloring of terrazzo and other hard-surfaced floors.

WOOD SEAL: A durable seal and surfacer for fine wood and gymnasium floors.

SUPERIOR FINISH: A heavy-duty surfacer for wood and other floors.



MAINTENANCE PRODUCTS

GRIPTEX: A slip-resistant powder sprinkled on floors made slippery by temporary wet or oily conditions.

GUMROK: An abrasive plastic-like coating applied at all slip hazard points. Bites through spillage of oil, grease, water. In red, brown, black, green.

DAMP SWEEP TOOL: The first implement especially made for damp sweeping. Fastened double swivel gives complete maneuverability. Makes it easy to sweep under chairs, desks, other objects. Removes dust completely.

CLOCLAMP: A lightweight one-piece device for easy damp sweeping. Fits over your present broom handle, holding cloth in place.

LEGGE CONDUCTIVE PRODUCTS

Guard against fire and explosion caused by Static Electricity. These Safety Products protect lives and preserve property.

ELIMSTAT: A low-cost conductive finish that is easily painted on floors. Creates safe conductivity by dispersing static electricity.

CONDUCOTE: A heavy-duty conductive coating. Spark-proof.

NoSTAT: A grounding device that protects personnel against static charges. Clamped on sole of shoe.

BOOTIE: Worn comfortably over any shoe, drains static to conductive floor, protecting personnel from discomfort of shock.

SAFESTAT: A grounding device attached to equipment or machinery. 7" x 7" metal plate never loses contact even if moved or kicked.

Branch offices in principal cities. Write today for full information and Free booklet.

LINCOLN-SCHLUETER FLOOR MACHINERY COMPANY

COMPLETE LOW-COST FLOOR MAINTENANCE
and Refinishing Made Easy With These Sturdy, Efficient, Time-Saving Machines



LINCOLN SINGLE DISC SCRUBBERS AND POLISHERS

These famous heavy duty scrubbers and polishers come in 5 sizes according to brush spreads: 12"; 14", 16", 19" and 21". Finely balanced for easy control, quiet. Handle adjustable to height of operator.

More than 40 MODELS in the Lincoln Line



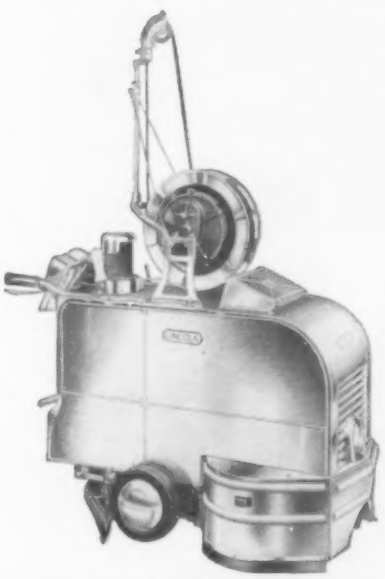
LINCOLN SINGLE DISC RUG AND FLOOR SCRUBBERS

Single disc machines with solution tanks on handles for easy efficient use of shampoo or detergent. Aluminum backed, split-feed brushes for shampooing rugs or scrubbing floors. A change of brushes makes it a polisher also. Four models, 012, 118, 215 and 216.



LINCOLN TWIN DISC SCRUBBERS AND POLISHERS

Ideal for smaller schools and places where older men or women do the work. Available in two sizes, N-132 with a brush spread of 16 inches and N-121 with 21-inch span High Lincoln Quality.



LINCOLN AUTO SCRUBBER

One man and a Lincoln Auto scrubber will scrub and vacuum up to 400 sq. ft. per minute. An ideal floor machine for schools with large corridors and floor areas to be cleaned. Eight simultaneous automatic operations cut cleaning time to the minimum.

The New 1-Man Lincoln AUTO SCRUBBER

Available in Electrically Operated and Gas-Engine Generator Models with a Wide Range of Brush Spans.

Get Full Details on: 18"—24"—30"—37" and 60" brush span models of this miracle machine that will cut your costs to an all-time low!

REPRESENTATIVES IN ALL PRINCIPAL CITIES — WRITE FOR COMPLETE INFORMATION AND NAME OF NEAREST FACTORY DEALER



Lincoln-Schlueter
FLOOR MACHINERY COMPANY
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MORE THAN 50 YEARS OF SERVICE

World's Manufacturer of the Most Complete Line of Floor Maintenance Equipment

MULTI-CLEAN PRODUCTS, INC.

2277 Ford Parkway, Dept. AS, St. Paul 1, Minn.

MULTI-CLEAN *Method* with MULTI-CLEAN Equipment



Scrubbers with tanks attached are available in the five heavy-duty sizes.



MULTI-CLEAN FLOOR MACHINES

Many schools, institutions and parishes are realizing tremendous savings in time and money on their floor maintenance with dependable Multi-Clean equipment. A complete line, from the Lite-12 model to the heavy-duty floor machines and scrubbers in sizes for every need, offer you the following advantages: *dual-purpose 2 hp. switch, adjustable handles, special GE motor and sealed eight ball bearing gear unit that never needs lubrication.* Multi-Clean Machines are easy to operate, are approved by Underwriters' Laboratory, Inc., for both polishing and scrubbing floors. There are attachments for scrubbing, shampooing, buffing, dry cleaning, waxing, polishing, sanding, grinding, troweling. Floor machines with the exception of the 12" machines are drilled for quick installation of solution tanks.

HOW TO SELECT A MACHINE SIZE TO FIT YOUR FLOOR AREA

In the interest of economy and efficiency here is a guide to selecting the proper size floor machine with respect to the floor area to be covered.

MC-12 Brush Area is 113 sq. in.	MC-14 Brush Area is 154 sq. in.	MC-16 Brush Area is 201 sq. in.	MC-19 Brush Area is 283 sq. in.	MC-22 Brush Area is 380 sq. in.
Floor Area 750 to 2,000 sq. ft.	Floor Area 2,000 to 5,000 sq. ft.	Floor Area 5,000 to 10,000 sq. ft.	Floor Area 10,000 to 20,000 sq. ft.	Floor Area 20,000 and Over

Write today for more information





MCV-214A, Also MCV-220 10 and 16-gallon capacities

MULTI-CLEAN VACUUMS WILL HANDLE ALL YOUR CLEANING JOBS

The new F-300 Vac Blower with detachable portable power head





MCV-205B 5-gallon capacity

MCV-255A 50-gallon capacity

Cleaning problems are minimized wherever Multi-Clean's high performance wet-dry vacuums are used. The many quick on-off attachments make every conceivable cleaning job easy and thorough. Latest exclusive Multi-Clean vacuum cleaner features on the MCV series include the amazing *electronic shut-off*, which prevents expensive motor flooding and the new *stabilized motor brushes* with twice the effective life of old-type motor brushes.

MULTI-CLEAN® PRODUCTS INC

2277 Ford Parkway, Dept. AS, St. Paul 1, Minn.

MULTI-CLEAN *Method* with MULTI-CLEAN Floor Finishes

Years of study, research and actual floor maintenance experience have gone into the development of Multi-Clean Floor Maintenance Materials. They are formulated and manufactured in Multi-Clean's own chemical laboratory and plant using the finest ingredients obtainable. Every Multi-Clean liquid is thoroughly tested and approved in the field by actual applications on all types of floors in daily use.

Multi-Clean Floor Maintenance Materials are easy to apply by following the simplified Multi-Clean Method, and they are economical. You can depend on them to make your floors look better and last longer. Not to be overlooked, floors treated with the Multi-Clean Method are easier to clean and stay clean longer. There's a Multi-Clean floor finish or floor treatment for every type of floor and floor condition. Write for complete information.





Multi-Clean Gym Finish

Provides hard, durable, easily cleaned surface, impervious to rubber burns. Assures fast, firm, safe, non-slippery footing. Protects and beautifies, does not darken. Meets all specifications established by Maple Flooring Manufacturers Assn. U/L approved for wood.

Multi-Clean Penetrating Seal

For all types of wood floors. Non-yellowing, dries to clear, hard finish in 4 to 5 hours. Fast, thorough penetration. Resists wear. Ideal as base coat before waxing. U/L approved.

Multi-Clean Super Safety Cleaner With Activated HCP additive for Higher Cleaning Power

Super Safety Cleaner's speedy HCP action lifts stubborn dirt and grime off floors quickly, holds it in good suspension for easy removal with wet pick-up vacuum cleaner, floor squeegee, or mop. Goes twice as far as ordinary cleaners . . . cleans perfectly in hardest water . . . safe for all floors. Also available with germicide antiseptic. Will or will not remove wax depending on mixture.

MULTI-CLEAN WATERPROOF FLOOR WAX

Purest Carnauba base, water emulsion wax. Dries to hard, abrasion resistant, anti-slip finish in 20 minutes . . . quickly polishes to high gloss, anti-slip surface if desired. Available in two types: regular or anti-slip fortified with DuPont "Ludox". Both U/L approved. MULTI-CLEAN SPIRIT WAX for cleaning and waxing your wood and linoleum floors in one operation. Tile red, green, maroon, brown, gray, natural and colorless.

Multi-Clean Asphalt Tile Preserver

Penetrates and seals in one application, preserves the beauty of new tile, revives color and finish on old, faded floors. Highly resistant to grease, water, soaps and alkalies. Easily applied and ready for traffic in 20 minutes. U/L approved.

Multi-Clean Terrazzo Sealer

One coat provides thin, tough, long-lasting finish, sealing pores to prevent chipping and corrosion. Positively non-yellowing. Brings out natural beauty and vivid colors of terrazzo. Resists water, acids, alkalies, soaps, grease, solvents. U/L approved.

Multi-Clean Neo-Dry Concrete Sealer

(*Rubber Base*) Fast drying, easy to apply, prevents dusting and chipping. Highly resistant to alkali and other corrosive agents. Tile red, brown, green, gray, light gray, white, black and natural. **MULTI-CLEAN CONCRETE PRESERVER** (*Bakelite Base*) also available.



Every MULTI-CLEAN Product Carries a 100% GUARANTEE

FLOOR CARE HANDBOOK



44-pages packed with valuable information about floors and how to maintain them for lasting results and at lower costs.

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THE SPENCER TURBINE COMPANY

Hartford 6, Connecticut



VACUUM CLEANING—ADVANTAGES

Educators, architects and engineers agree that vacuum is the only way to properly clean a school. Spencer Vacuum has been the accepted standard in all types of buildings *for many years* and is installed in thousands of schools.

For perfect sanitation, there is no method that will pick up more dust and dirt, and at the same time, require less of the janitor's time. For instance, one janitor can easily clean twelve classrooms in two hours. It is equally efficient for wood, tile, linoleum or cement floors. Less frequent waxing is required for polished floors. Rugs, carpets, furniture and decorations last longer.

THE SPENCER MOP-VAC



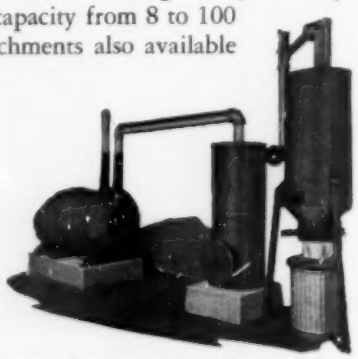
Also floor slots and box type for attaching to Spencer portables.

Workers can clean the dry mops more thoroughly and more frequently. A few steps and a few passes of the mop over the vacuum slot, and all strands are shaken violently by the high velocity air. All dust goes down enclosed pipes to the basement.

Cabinet units are made in three types: The open type, and high and low enclosed cabinet types.

WATER PICK-UP

Vacuum will pick up liquids. By placing a wet separator tank between the vacuum tool and the inlet valve, all the liquid can be collected without entering the vacuum system. These tanks have a capacity from 8 to 100 gallons. Special tank attachments also available for Spencer portables.



Spencer Central Vacuum Cleaning is a permanently installed system and consists of five essential parts, each carefully selected to meet the special requirements for each individual building:

1. A vacuum producer, located in the basement.
2. Inlet valves, conveniently located on all floors and piped to vacuum producer.
3. Specially designed, entirely enclosed, and easily cleaned separator.
4. Light weight, flexible hose.
5. Special vacuum tools for each operation.

Ask for Bulletin No. 138-C on Spencer Mop-Vac and Bulletin No. 133 on Stationary Vacuum Cleaning Systems.

SWIMMING POOL CLEANING EQUIPMENT:

By means of special cleaning tools usually employed in connection with the pump on the filtering system, it is possible to remove accumulated sediment from swimming pools without the waste of water involved in draining the pool. Bulletin No. 139.

BOILER TUBES CLEANED



Spencer Vacuum keeps boilers working at top efficiency by cleaning soot out of boiler tubes, in this way often saving the cost of the entire installation within a few years. Spencer Vacuum also keeps boiler room floors clean, and easily removes soot and dust from overhead pipes. Bulletin No. 137.

SPENCER VACUUM TOOLS:

Special Spencer tools have been developed for the above and many other purposes. Connections to the vacuum hose are made through light weight aluminum handles and special Spencer elbow joints which have a swivel hose connection. This allows the hose to hang freely, away from the body of the operator. A shut-off valve conserves power when the vacuum tool is not in use. Bulletin No. 115.

PORTABLE VACUUM CLEANERS

Spencer Portables built on the same principles of design and using the same vacuum tools are available in sizes from ½ HP up. The 1 HP unit illustrated is used extensively in schools. It has a large capacity dirt can which may be dropped to the floor by pressing the foot cam, and then rolled on its own casters to any point. Large bag area is cleaned by shaking without removing. Machine on large wheels, turns easily in small space. Ask for Bulletin No. 114-D.



UNITED FLOOR MACHINE COMPANY, INC.

7715 South Chicago Avenue • Chicago 19, Illinois

Maintain Your Floors Better, At Lower Cost, With UNICO Equipment



Unequalled For Scrubbing, Waxing, Polishing, Sanding, Buffing, Steelwooling

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AVAILABLE IN 12", 13", 15",17" and 20" BRUSH SIZES

UNICO Floor Machines are unsurpassed in value and performance, precision engineered for top efficiency, fully guaranteed. Proven best for scrubbing all types of floors sparkling clean. Quickly converted to wet scrubbers for shampooing rugs and carpets right on the floor. In addition, brushes and other attachments can be interchanged for waxing, polishing, sanding, buffing, grinding, steelwooling. Reversible safety control switch, adjustable handle, ball-bearing wheels, retractable wheel carriage, non-marking rubber bumper, G. E. motor, and other features make Unico your best floor machine buy!



Model S-12B Aero For Smaller Floor Areas

Small in size, mighty in performance, low in cost, easy to operate. Specially designed for maintenance of smaller floor areas. Weighs only 42 pounds, easy to carry. Features new Uni-Drive; no gears, no grease, no noise. 12" brush size. Quickly converts from polisher to wet scrubber. With attachments, it also waxes, sands, buffs, steelwools, polishes, etc.

Unico's Powerful, Efficient Vacuum Equipment Simplifies Wet and Dry Pickup



DRY-VAC—Vacuum attachment for Unico machines vacuums dust and dirt and polishes floors in a single operation. Picks up all fine steelwool particles during steelwooling. No dust during disc sanding.



Model UVI-901BP—UNI-VAC portable vacuum for wet and dry pickup. No mops, no pails, no wringers. Capacity, 10 gal. liquid, or 1¾ bushels refuse. 1 H.P. silent motor. Can be used for blowing.



Model UVM-902—UNI-VAC portable vacuum for heavy duty industrial use. Ideal for cleaning boilers, furnaces, etc. Built-in cord reel. Outside dust bag. Powerful 1¼ H.P. motor.



Model UVI-903—UNI-VAC super-heavy-duty, super-quiet portable vacuum for wet and dry operations. Built-in cord reel. Capacity, 12 gal. liquid, or 2 bushels dry refuse. 1¼ H.P. silent motor.

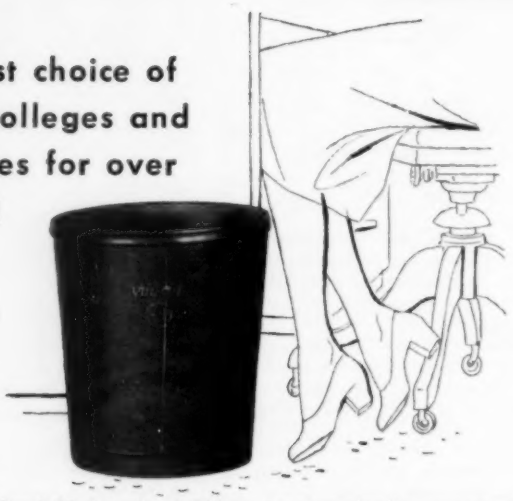
WRITE FOR DETAILS . . . ASK FOR FREE DEMONSTRATION ON YOUR OWN FLOORS

NATIONAL VULCANIZED FIBRE CO.

Wilmington, Delaware

VUL-COT® . . . Your Best Buy because it . . . Lasts a Lifetime!

. . . the first choice of schools, colleges and universities for over 40 years!



. . . made of Hard Vulcanized Fibre (a chemically converted cellulose product not to be confused with soft fibre boards), will not crack, dent, splinter, rust or corrode—with normal usage will last a lifetime.

. . . completely smooth interior—nothing to prevent the free disposal of contents.

. . . practically indestructible—double rolled top and bonded side seam construction.

. . . standard colors are an integral part of the fibre—they will not chip or wear off. VUL-COTS will not mar or stain furniture or clothing.

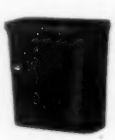
. . . light in weight and noiseless—no "tinny" noise with VUL-COTS.

VUL-COT waste baskets are made to give years of attractive service. The initial cost is more than amply repaid in continuous satisfaction to you.



Here's your guarantee of a better buy!

AN INCLUSIVE RANGE OF STYLES AND SIZES

	**ROUND TAPER** Popular for office and classroom. Large in capacity, occupies small space.		No. 2 / No. 3
		Top Dia.:	12" / 14"
		Bottom Dia.:	10" / 12"
		Depth:	14" / 16"
	**SQUARE TOP** Same as No. 2 above but with square top. Fits corner or against wall.		No. 2-A
		Top:	10½" x 10½"
		Bottom Dia.:	10"
		Depth:	14"
	**SQUARE TAPER** A distinctive style, popular with executives. Ideal for reception or board rooms.		No. 5
		Top:	12" x 12"
		Bottom:	10" x 10"
		Depth:	15"
	**RECTANGULAR** Large capacity, yet takes up small space. Nestles against desk or wall.		No. 5-A
		Top:	Length 15½" Width 9¼"
		Bottom:	Length 14" Width 7"
		Depth:	15"
	**ROUND STRAIGHT** Specially designed for washrooms, cafeterias, libraries, laboratories.		No. 9 / No. 10
		Diameter:	14" / 14"
		Depth:	20" / 30"

COLORS—maroon-brown and olive-green are an integral part of the fibre and will remain constant for the life of the basket. A neutral tone gray lacquer finish is also available to blend with gray steel furniture.

Write today for catalog price sheet—Dept. TT-4.

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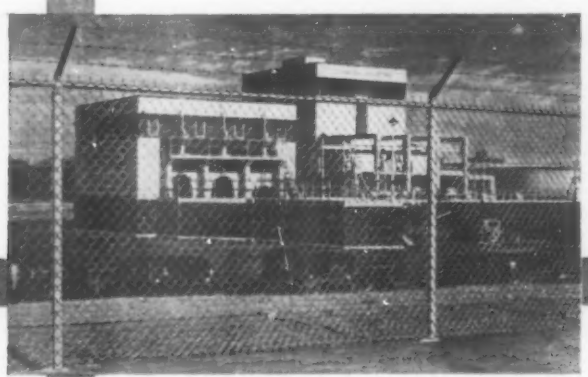
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BRANCHES AND ERECTORS IN KEY CITIES EVERYWHERE

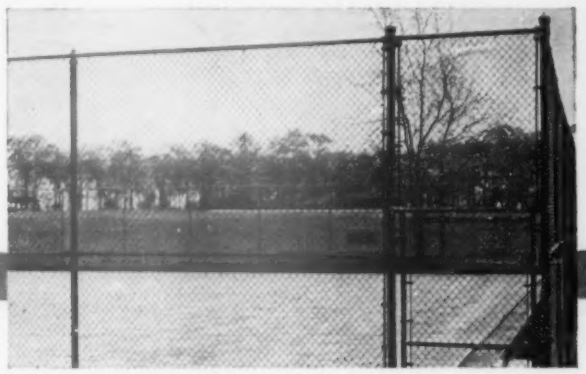
REALOCK FENCE

Realock Fence assures real locked-in protection for your grounds and buildings, because bolts on all fittings, hinges and locking devices are removable only from the inside — safely secure from outside tampering. Realock Fence is also available for enclosing playgrounds, tennis courts and athletic fields.

Noted for its rugged construction and long-lasting weather resistance, Realock Fence can be depended upon for years of low-cost, trouble-free service. Supplied in standard heights up to and including 12 feet. Furnished with barbed or knuckled selvage; with or without barbed wire topping. Expert erection service conveniently available. Write our nearest sales office or consult your classified telephone directory.



TYPE 423-H Realock Fence, 8 feet high, using "H" section posts. Topped with three strands of barbed wire. Five and six strand barbed wire topping if so desired.



REALOCK TENNIS COURT ENCLOSURE. Illustration shows a typical Realock Tennis Court Fence design. Two types are available — 310 (Light construction) and, shown here, 420 (Heavy construction). Standard heights, 8', 10' and 12'.



TYPE 320 Realock Fence, five feet high with tubular post construction and barbed selvage, top and bottom. This fence can also be supplied with knuckled selvage top and bottom.



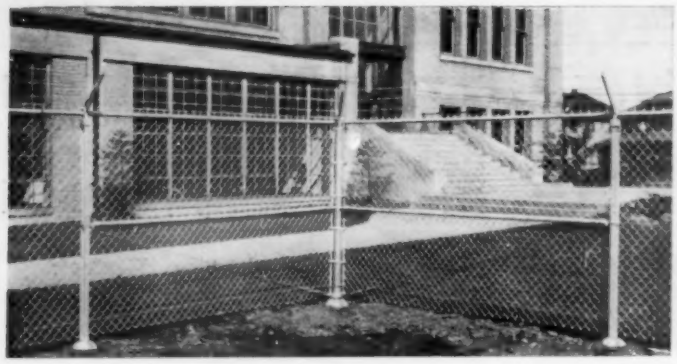
TYPE 420 Realock Fence, 7 feet high with barbed selvage at top. This view shows the sturdy, tubular end-post construction — assurance of long-lasting strength and minimum maintenance for years to come.

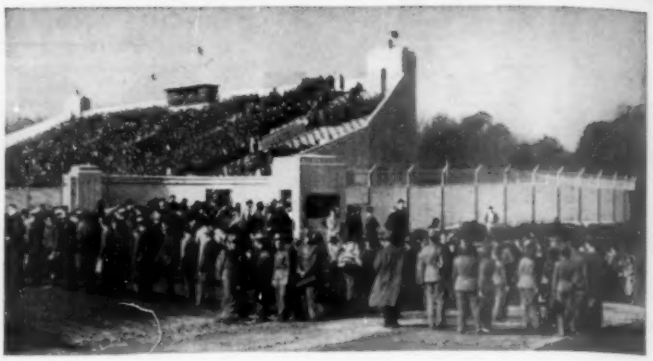
CONTINENTAL STEEL CORPORATION

Manufacturers of Chain Link Fence for All Purposes

* *"SALES REPRESENTATIVES IN PRINCIPAL CITIES"*

CONTINENTAL *Chain Link* FENCE





COMPLETE CHAIN LINK FENCE

To meet the fencing requirements of schools and universities, Continental has developed a wide range of structural variations in its Chain Link Fence. The selection in styles, heights, types of top construction, gates and accessories makes it possible for schoolmen to select the best fence for any installation.

MADE OF KONIK STEEL

FABRIC OF KONIK STEEL

The wire fabric in Continental Chain Link Fence is made of KONIK—a new steel containing copper, nickel and chromium for greater strength and rust resistance "clear through." This superior fence fabric carries a zinc coating applied by a special hot dip process to insure uniformity and adhesion of the coating to the base steel. A uniform, bright finish enhances the appearance of Continental fence fabric. Wire is full gauge and woven in exact mesh.

TAILORED TO FIT SCHOOL PROPERTY

Experienced fence engineers plan and help erect Continental Chain Link fence anywhere. No matter what your property protection problem, Continental engineers will work with you in laying out the most effective and economical installation—planned to harmonize with the character of school property, and provide the type of protection you want.

10 STYLES

Continental offers 10 styles of top construction for Chain Link Fence. Six popular styles are illustrated to the right. Continental fence is engineered for each specific job.

POSTS AND FITTINGS

Continental fence has heavier, sturdier posts with improved brace construction. Top rails are joined by a special Inside-Outside coupling. Post caps and barbed wire arms are sturdy, heavier. Self-locking slots hold barb wire. New type lock pin eliminates bolts and nuts for fastening fabric to tension bands.

GATES

Strong and easily operated gates and locking devices. Single and double types with improved pivot type hinges. Manually or mechanically operated.

ENGINEERING AND ERECTION SERVICE

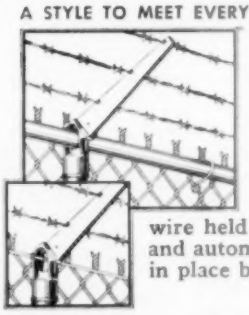
Our engineers are prepared to assist you in laying out the most economical installation for your purposes. Trained erection crews are available for correct and economical construction anywhere. When local labor is used Continental will supply competent foreman and inspection service.

SEND FOR FREE MANUAL

This file size book contains more than 100 illustrations, will help you evaluate fence protection, select right style of fence. Write the



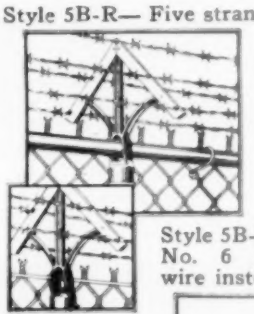
A STYLE TO MEET EVERY SCHOOL NEED



Style 3B-R—Three strands of barb wire with top rail. Arm of 12 gauge pressed steel. Barb wire held in angle slots and automatically locked in place by tension.

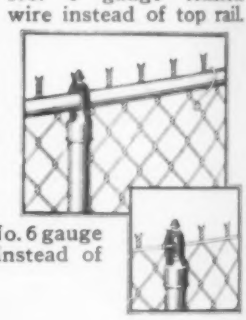
Style 3B-W Same with No. 6 gauge coil spring tension wire instead of top rail.

Style 5B-R— Five strands of barb wire with top rail. Top rail of tubular steel 1⅝" O. D. Has 7" expansion sleeves.



Style 5B-W—Same with No. 6 gauge tension wire instead of top rail.

Style NB-R—No barb wire with top rail. Style NB-W



—Same with No. 6 gauge tension wire instead of top rail.

* Trade Mark Reg. U. S. Pat. Off.

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CONTINENTAL STEEL CORPORATION

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UNITED STATES STEEL

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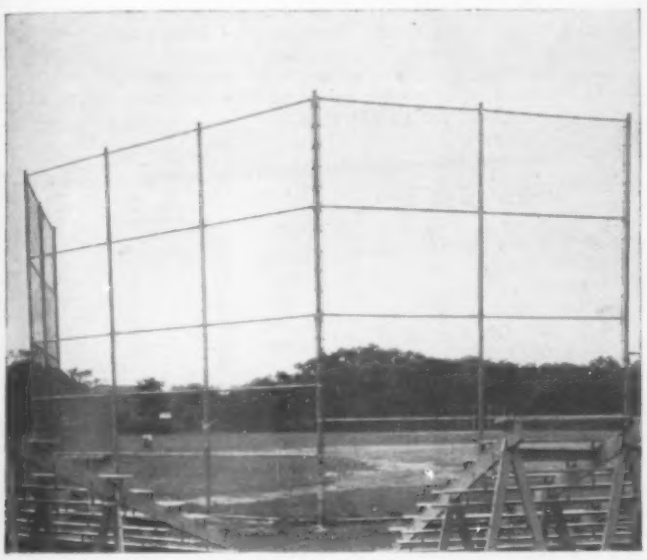
Waukegan, Ill. — Newark, N. J. — Oakland, Calif. — Greensburg, Ind. — Fort Worth, Texas — DeKalb, Ill.

United States Steel Export Company, New York

FOR enclosing school yards, playgrounds, athletic fields, outdoor pools—Cyclone Chain Link Fence provides the utmost in protection for children, property and equipment. And it's not surprising, because Cyclone has long specialized in fencing school property.

In the long run, Cyclone is most economical, too. It is strongly constructed of special steel fabric—galvanized after weaving for complete weather resistance. It embodies many special features of design and construction. Installation is made by Cyclone's factory-trained experts. The result: a Cyclone Fence stays taut and true . . . gives long, trouble-free service.

For athletic fields, for stadiums—wherever paid admissions are a factor—a Cyclone Fence provides effective "entrance control" . . . makes gate receipts go up, and ticket collecting easy.

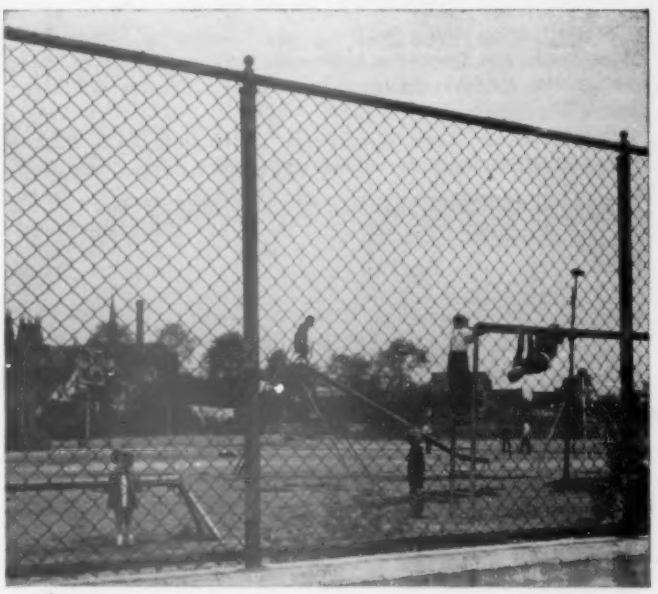


SEND FOR OUR FREE ILLUSTRATED BOOK — "Your Fence — How To Choose It — How To Use It." Its 32 pages are packed with interesting, helpful information. Also available is a folder giving detailed specifications for Cyclone Fence and other wire products used for school properties. And for help in making cost estimates — our sales engineers are at your service. There is no obligation incurred.

Cyclone is the trade-mark name of fence made only by Cyclone Fence. Accept no substitute.

NO JOB IS TOO LARGE

—NO JOB IS TOO SMALL FOR CYCLONE



Cyclone "Safeguard" Chain Link Fence for schools, playgrounds, parks, institutions, etc. For fencing school property, Cyclone recommends six-gauge wire because of its greater strength.

Cyclone Backstops can be furnished in standard specifications or made to your special requirements.

Cyclone Tennis Court Enclosures are "standard equipment" for many of the finest tennis clubs.



THE STEWART IRON WORKS COMPANY

"Fence Builders to America Since 1886" INCORPORATED

2103 Stewart Block, Cincinnati 1, Ohio

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Bronze Tablets
Chain Link Wire Fence and Gates
Flag Poles
Folding Gates



PRODUCTS

Iron Fence and Gates
Pipe Railing
Settees
Stadium Seat Brackets
Window Guards
Wire Mesh Partitions

FOR EVERY PURPOSE

Stewart offers Plain or Ornamental Iron and Chain Link Wire Fence and Gates for front, side and rear property lines; for athletic fields, tennis courts, recreation grounds and other school requirements.

Stewart Chain Link Wire Fence is the only ALL BEAM FRAMEWORK construction on the market. The Chain Link Wire Fence illustrations clearly show this exclusive feature. Notice the 3TH Oval-Back I-Beam Line Post with integral extension arm. Obviously this solid post is superior to pipe or other types of post requiring a separate pressed steel arm which may be removed or easily broken. Notice, too, that the beam top rail passes through the post itself — eliminating the need for fittings. The flat, smooth surfaces of Stewart All Beam construction offer maximum resistance to wear, weather and corrosion. This type of fence structure, exclusive with Stewart, is the heaviest and strongest manufactured.



Style 0TH Chain Link Wire Fence



Style 3TH

Usual heights of style 3TH shown in illustration are 7 ft. and 8 ft. overall. All materials are of Copper-Bearing Steel hot-dipped galvanized *after* fabrication to assure greatest possible resistance to rust.

CATALOGS — SALES AND ERECTION SERVICE

Literature is available on all Stewart products. If interested in Chain Link Wire Fence ask for Catalog No. 85. If in Iron, ask for Catalog No. 84. When requesting catalogs, please indicate products in which you are primarily interested.

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For front property lines where dignity as well as protection is a requisite, Stewart offers a multiplicity of designs in plain or highly ornate iron. Here again Stewart construction is unique. The patented channel rail, exclusive with Stewart, adds immeasurably to the strength of the fence. All fittings are of Stewart design—the result of 66 years' experience and research in the fence building field.

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Effective and economical enclosures for locker rooms, stock rooms, supply rooms, toolrooms, machinery, power houses, etc. When writing for prices please send sketch giving measurements.





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Ideal for hard or soft baseball diamonds, tennis and badminton courts, etc. Sturdily constructed to stand the toughest abuse. Literature and prices furnished on request.

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Plaques and tablets of hand-chased cast bronze, are available in stock sizes from 9" x 16" to 24" x 36". Special sizes will be made to order. Literature and prices gladly sent on request.



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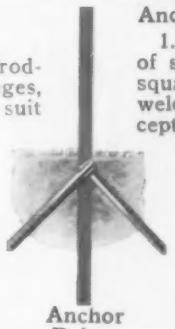
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Makers of America's first chain link fence, the Anchor Post Fence Division today manufactures a complete line, and will be glad to supply any interested school executive or architect with a copy of our Chain Link Fence Catalog containing full information about the four exclusive features which make an Anchor Chain Link Fence exceptionally attractive and durable. **Ask for Catalog No. 120.**



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Note: While we strongly advocate the drive-anchor method of setting posts, we can, if desired, set our posts in concrete footings when conditions warrant such a procedure.

Anchor's Four Features

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2. SQUARE TERMINAL POSTS—stronger because they are square in section. More protective—having no fabric-holding bands and therefore providing no footholds for climbing. Better-looking—because of their graceful lines.

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4. DRIVE-ANCHORAGE—grips the soil like the roots of a tree. We have imitated nature's engineering by providing the line posts with a broad foundation. Anchor drive-anchors defy thaws, frosts and the many other strains to which a fence is subjected.



Anchor-Weld Wire Gate



Anchor Chain Link Fence around Playground



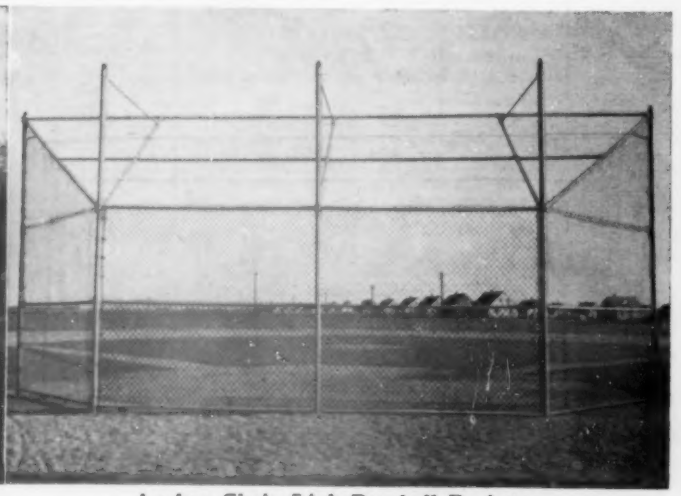
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- MODEL 24R—24" heavy duty with reverse
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Whether you need a power mower for boulevard or park work, for school or institution lawns, there's a Devere to do a smooth, fast job at low cost.

Devere uses the "suction-lift" principle to hold grass in position for the whisk-away action of the high-speed cutter blades. Grass clippings become a fine, beneficial mulch that filters down to the roots. High weeds and other rank growths go down quickly under the Devere.

Thousands of Devere Mowers are in daily use, keeping large lawns smooth and inviting. They end leaf-disposal expense—an advantage that can be yours. Write for the whole story.

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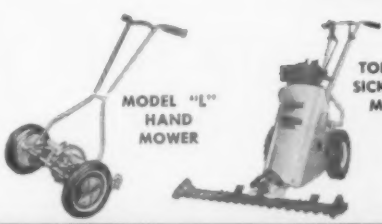
32" SPEEDWAY with riding sulky

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Yes, users agree *easy* is the word for it! Eclipse mowers are precision built to give top performance—not only when new, but through constant use, season after season. They're made to cut efficiently, handle easier, last longer ... with a minimum of maintenance expense. See in the specification charts below the extra value that's put into each Eclipse mower to assure your satisfaction ... for years to come.

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MODEL "L" HAND MOWER

TORNADO SICKLE BAR MOWER



21" PARK-HOUND

FEATURES LIKE THESE MAKE ECLIPSE POWER MOWERS EASY TO USE

Model	Type	Width of Cut	Height of Cut	Engine (4 Cycle B&S) H. P.	Engine (4 Cycle B&S) Max. R.P.M.	Starter	Cutting Unit	Clutch	Drive	Lubrication	Operating Speed (MPH)	Daily Acreage Capacity	Riding Sulky
Lark	Reel	18"	½"—1½"	1 1	3200	Rope	5 blade, 5 spider reel	Spring action	Diamond Roller Chain	Oil cups	1—3	—	No
Rocket	Reel	20"	¾"—1½"*	1 1	3200	Rope (Lever optional extra)	5 blade, 5 spider reel	Internal expansion	¼" Diamond Roller Chain	Oil cups	1—3	—	No
Rocket Deluxe	Reel	20"	¾"—1½"	1 1	3200	Lever	Elmco-treated 5 blade, 5 spider reel	Internal expansion	¼" Diamond Roller Chain	Oil cups	1—3	—	No
Parkhound	Reel	21"	¾"—1½"	1 6	3200	Lever	5 blade, 5 spider reel	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—3½	2—4	No
Convertible**	Rotary	20"	1"—3"	2	3600	Rope	Hardened steel, replaceable	—	Vertical Shaft	—	—	—	No
Rolloway	Reel	25"	¾"—2½"	2 5	3600	Lever	5 blade reel with 5 double-riveted spiders	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—4	3—5	Optional extra
Speedway	Reel	32"	1"—2½"	5.1	3200	Crank	5 blade reel with 6 double-riveted spiders	Internal expansion	⅜" Diamond Roller Chain	Zerk fittings	5—7	7—15	Optional extra
Tornado	Sickle Bar	36"	¾" or 2"	2	3600	Rope	2 floating sickle knives furnished	Internal expansion	5/16" Diamond Roller Chain	Zerk fittings	1—3	—	No

*Rocket also available in HI-CUT model, to cut from 1½" to 2½". **Rotary available in hand or power propelled models. Push type may be easily converted to power drive at any time.
All Eclipse mowers have fatigue-free floating natural-grip handles, finger-tip clutch and throttle controls.
All reel type mowers have adjustable reel bearings and are available with automatic sharpeners (optional extra).

HERE'S WHY IT'S SO EASY TO USE ECLIPSE HAND MOWERS

Model	Width of Cut	Height of Cut	Reel	Adjustable Reel Bearings	Cutter Blade Adjustment	Wheels	Built-in Automatic Sharpener	Roller	Roller Bearings	Handle
Eclipse "L" (Std.)	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	Single thumb screw	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Eclipse "L" (Hi-Cut)	16"	1"—2"	5 blade, 4 spider reel, cylindrically ground	Full race ball	Single thumb screw	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Zephyr	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Vogue	16" or 18"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Rubber-covered	Adjustable	All steel natural grip
Arlington	16"	½"—1½"	5 blade, 4 spider reel, cylindrically ground	Full race ball	4 Micro-adjusting screws	Rubber-tired	Yes	Seasoned maple	Adjustable	Seasoned maple

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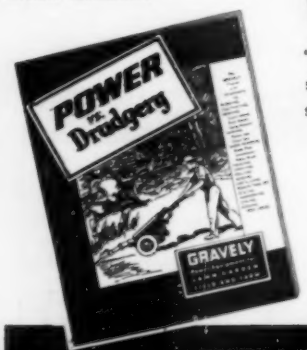


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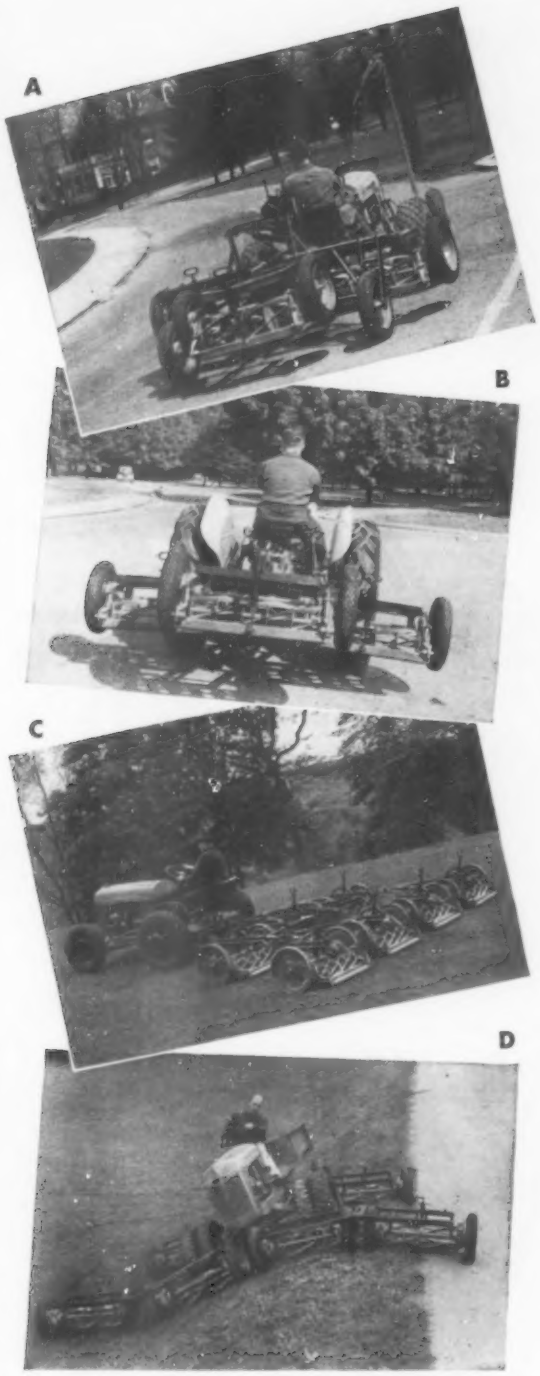
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Stroudsburg, Pennsylvania



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for every large area mowing job

Pioneer manufacturer of big-capacity gang mowers and tractors, Worthington furnishes units to municipalities for mowing parks, golf courses, athletic fields, boulevards—any big mowing job.

(A) Model G and Self-Lift Ranger The Model G Tractor with Ranger gang mower is ideal for cutting widely separated lawn areas. Mowers are raised and lowered hydraulically through positive control right at driver's finger tips. The Self-Lift Ranger is available with 3-gang Fairway and Blitzer Mowers.

(B) Ford Tractor and Ranger Worthington also builds a Self-Lift Ranger unit for Ford Tractors. Here, too, gang mowers are raised above the ground for quick, convenient, between-job transport. Choice of 3-gang Fairway or Grass Blitzer Mowers.

(C) Model G Tractor and Gang Mowers The Model G is an exceptional tractor for gang mower work. Underslung design permits cutting under low tree branches and around shrubs. Has low center of gravity, big low-pressure tires, short 5½-ft. turning radius. Gang mowers for the Model G include 3, 5 or 7-gang Fairway Mowers; 3, 5, 7 and 9-gang Blitzer Mowers. No tools needed to adjust cutting units—lubricated only twice a year.

(D) Model F Chief Tractor and Gang Mowers Front-wheel drive, rear-wheel steer puts the Model F a big step ahead in maintenance work. High maneuverability gives better control for cutting around trees and shrubs. Front-mounted gang mowers cut grass before tractor wheels touch it. Hydraulic gang mower control permits raising and lowering gangs—helps speed between-job travel. Hydraulically controlled gangs are available in 3 and 5-gang Blitzer and Fairway combinations for the Model F Chief.

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This big, featherweight, sturdy YAZOO MASTER MOWER excells on the campus . . . designed to do all mowing quickly, easily and at minimum maintenance cost. Model C66-27, pictured above, is the ultimate in rotary power mowers. This mower gives you a full 27″ cutting swath plus a husky 6 hp 4-cycle air-cooled engine. Remote controls and excellent power driving mechanism keeps adequate speed capacity even under toughest cutting conditions. Available also in push models, No. C-6-27 or B-6-25, the Yazoos are built to absorb maximum shock or abuse to blade and chassis, assuring you of steady, dependable service.

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Advanced patented high wheel suspension assures greater operating efficiency. Starts where others stop.

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MODEL B-24 SERIES



★ **Adjustable guards as shown, optional on all models.**

Here is one of the most popular YAZOO MASTER MOWERS. This heavy-duty mower features a 24″ swath. Like all YAZOOS, the B1-24 has been tested and proved under the toughest mowing conditions over the past nine years. The choice of 3, 2½, or 2 hp gasoline engines assures you of trouble-free, economical operation.

MODEL A-20 SERIES



It will pay you to investigate YAZOO'S A-20 Series. Featuring a 20″ or 21″ swath, this compact machine is available with 3, 2½, or 2 horsepower. Large wheels make for high maneuverability and easy handling on slopes and in rough areas.

Here are some other outstanding features of the YAZOO Master Mower

★ ENGINES—nationally accepted and can be serviced everywhere.

★ FRAME—long-life steel and shock absorbing tubular lightweight construction.

★ WHEELS—heavy-duty bicycle and industrial-type wheels assure easy, positive, maneuverable operation—minimizes scalping.

★ BEARINGS—highest quality and sealed where necessary.

★ BLADES—solid, spring steel with full cutting edge, no friction drag.

★ DRIVES—mechanically-propelled or push models (single and double belt or direct).

★ CUTTING HEIGHT—quick, easy and can be adjusted by operator.

★ PERFORMANCE—mows tallest grass, toughest weeds or velvet lawns . . . light, smooth running . . . takes steep grades easily . . . eliminates most trimming.

★ ECONOMY—extra low maintenance and operating costs.

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2. **Reporting of successful administrative practices.**
3. **Presentation of educational issues and policies.**
4. **Counsel on educational planning.**
5. **Counsel on school plant planning.**

1. School Executive gives high priority to news each month in the following three separate sections:

In "Spotlight" our editors briefly highlight the month's interesting and important happenings on the educational front, providing busy school administrators with a panorama of the rapidly unfolding educational scene.

Because of its key importance, The School Executive provides on-the-spot coverage of the Nation's capital through Belmont Farley's monthly news letter, "The Washington Scene," telling what is going on that affects education in Congress and in the myriad departments and bureaus of the federal government—and what it means to schools.

The School Executive staff saves many hours of research for school administrators by culling out and reporting in "New Product Reviews" section the best and latest developments in equipping and maintaining the school plant.

2. Articles on successful administrative practices and programs are featured each month in the "Schools in Action" section of The School Executive. Authored by leading educators, "Schools in Action" articles are eminently practical—reporting aims, plans, methods and results.

3. The school administrator looks to his professional magazine to inform and enliven his thinking on educational policy, and expects the magazine to take a forthright position on controversial issues.

The School Executive editorials in "Keynotes" reflect the combined insights and experience of the editor and leaders in the profession. The position of this magazine on major educational issues is democratically developed by its staff and editorial advisory board.

Another interpretive feature upon which readers of The School Executive have come to rely increasingly is the page "As I See It" by Dr. Walter D. Cocking.

It is a major responsibility of the administrator to see that the members of his school board, his professional staff, and leading citizens in his community are kept informed concerning educational issues, pending legislation and other developments likely to affect the local schools. Such an interpretation of education to laymen interested in public education is the function of "Our Schools," a four-page insert which is bound in The School Executive each month, also offered in reprint form. Each month "Our Schools" discusses in non-technical language an important issue confronting the schools.

4. The successful administrator takes time to plan . . . In his schools educational planning is a continuous process involving the entire staff. He looks, meanwhile, to his professional magazine for help in his planning. Each month, in The School Executive, a comprehensive section is devoted to a study of one important planning problem, treated from a variety of angles covering both the underlying educational theory and its practical application.

5. School Executive believes that new school buildings should be designed to meet the needs of communities. "School Plant Planning" is a monthly feature through which School Executive seeks to make available to all who are engaged in the planning of new schools the experience and knowledge of specialists including architects, state directors of schoolhouse planning, school administrators and school plant consultants in the universities. School Executive also sponsors the annual Competition for Better School Design to encourage creative thinking in the design of educational buildings and to call attention to design which is interpreting modern educational programs effectively.

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Use the subscription form at the bottom of the facing page.

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